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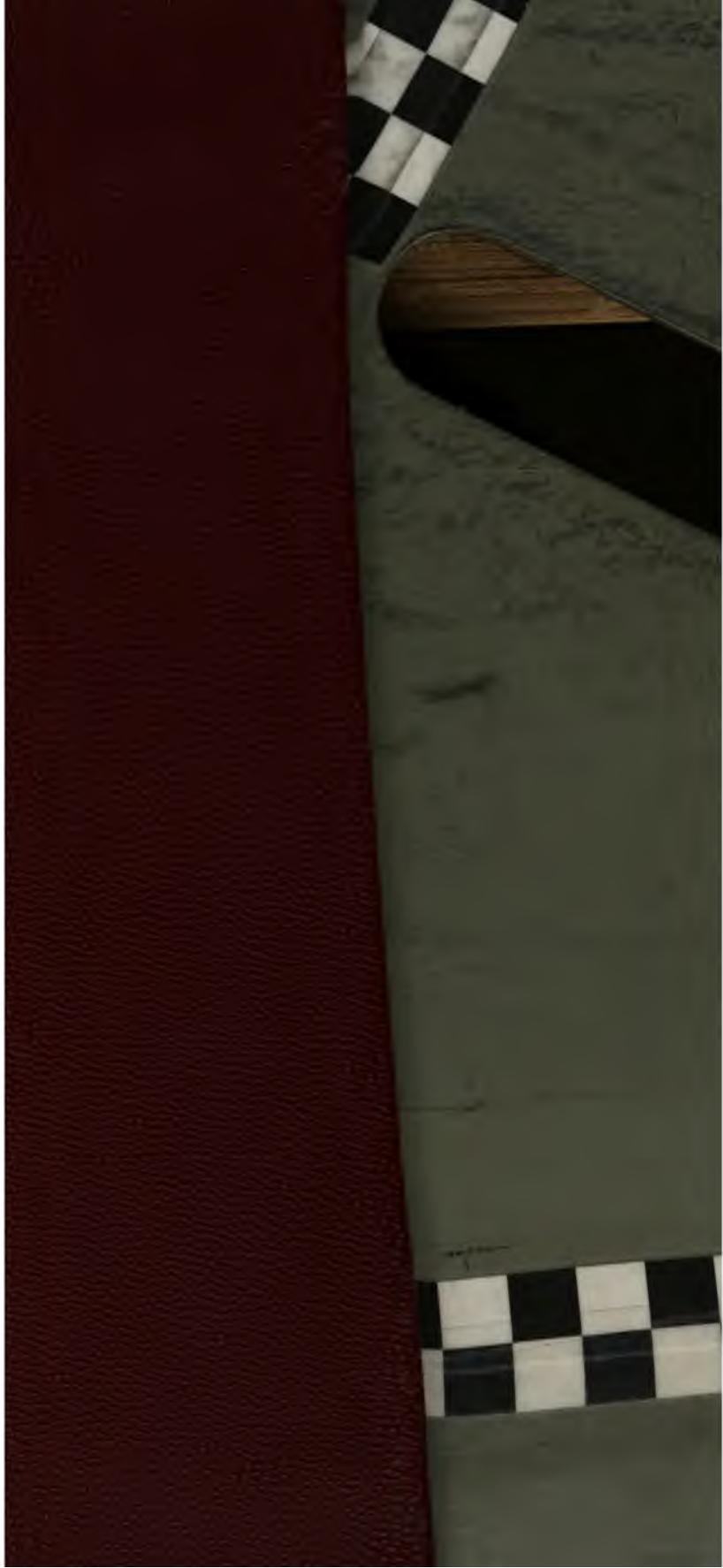
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Philadelphia, October 1, 1877.
HIGHER MEDICAL EDUCATION, THE TRUE INTEREST
OF THE PUBLIC AND OF THE PROFESSION.

AN ADDRESS



INTRODUCTORY TO THE 112TH COURSE OF LECTURES

IN THE

MEDICAL DEPARTMENT

OF THE

UNIVERSITY OF PENNSYLVANIA,

Delivered October 1, 1877.

BY

WILLIAM PEPPER, A.M., M.D.,
PROFESSOR OF CLINICAL MEDICINE.

PUBLISHED BY ORDER OF THE BOARD OF TRUSTEES, AND AT THE
REQUEST OF THE MEDICAL CLASS.

PHILADELPHIA:
COLLINS, PRINTER, 705 JAYNE STREET.
1877.

Edic 6381.16.32

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P R E F A C E.

THIS Address was delivered at the opening of the present course of lectures in the Medical Department of the University of Pennsylvania. As extensive and radical changes had been made in the plan of medical teaching in that school, it seemed proper that a full statement should be given of the reasons for such reforms. An attempt has been made, therefore, to present fairly the present position of medical teaching in America, to point out its chief defects, and to indicate the causes that have led to them, and the evils to which they in turn give rise.

In order to enable the accuracy of the statements in the following pages to be tested, as well as to afford information which may be of value to those who are specially interested in this subject, a brief synopsis of the present state of medical education in various countries has been prepared and printed, together with several statistical tables, in an Appendix.

In obtaining the material for this purpose, as well as that to serve as the basis of the statements in the text, the latest available official data have been used in every instance. I have great pleasure in acknowledging my indebtedness to Hon. Wm. M. Evarts and Hon. Frederick W. Seward, for most valuable assistance in obtaining direct official reports on medical education from a considerable number of foreign countries. A series of questions were forwarded through the Department of State at Washington to the proper officials in the respective countries, and a very interesting series of communications were received in reply. I take this opportunity, also, of thanking cordially the many kind friends in America,

as well as in almost all of the countries referred to, for the valuable information furnished in reply to my personal enquiries. I must acknowledge finally my indebtedness to Dr. H. Billroth's comprehensive work on medical education in the German Universities.¹

In placing the manuscript of this Address at the disposal of the Board of Trustees and of the Medical Class, my earnest hope is that the facts stated in it may help to secure from all friends of Higher Medical Education a hearty approval and support of the Medical Department of the University of Pennsylvania, in the advanced position she has assumed.

WILLIAM PEPPER.

NOVEMBER, 1877.

¹ Billroth; ü. das Lehren u. Lernen d. medicinischen Wissenschaften an den Univ. d. deutschen Nation. Wien, 1876.

HIGHER MEDICAL EDUCATION—THE TRUE INTEREST OF THE PUBLIC AND THE PROFESSION.

THE choice of a subject for an address, such as I have to-day the honor of delivering before you, is usually a matter of no little difficulty. For many years the course of medical education in this country has been smooth and uniform. Few new features have been introduced, still fewer important changes or improvements have even been suggested. The profession and the public have become familiar with the routine pursued, and the orator, on such an occasion as the present, has had neither opportunity nor temptation to quit the pleasant if somewhat o'er-trodden path of eulogizing medical science; and the life and work and rewards of the physician. It is true that to those of you who are now entering for the first time on a course of medical study, there are practical questions of importance and interest concerning the best methods of study and the disposition of your time, which might be profitably considered. But many of my predecessors upon whom has devolved the duty I must now discharge, have discussed these questions with such thoroughness and ability as leaves little to be added.

But a few months have passed since the close of the Centennial year of our national existence. A year ago there were gathered in this city, the cradle of our nation's birth, the chosen representatives of almost every country on the globe. The occasion was one of singular interest. In vast halls, whose size and beauty made it seem that they had sprung into existence at the bidding of some magic power, were collected for study and comparison the choicest products of every soil and clime, the most finished works of art, and the most perfect specimens of mechanical skill from every country, in a word the evidences by which could be determined the growth and present position of each nation in all that serves to enrich, to embellish, to strengthen, and to advance civilization.

We had sought the test, and it was a searching one. The older members of the great family of nations did not despise the friendly challenge we had proffered; the fame of our enterprise and achievements had gone abroad; and the most ancient, the most powerful, the most highly polished and artistic people sent their finest works to stand side by side with those of the young western Republic. It is not too soon to learn the verdict that has been pronounced by the competent and impartial Judges chosen for this purpose from the most expert of each nation. Has it not stamped, with marks of strongest approbation, the achievements of our country in almost every branch of human industry? Has it not registered the fact that

in the brief space of a century we have taken such vast strides in material development, that in many things we approach the older nations, and that in many we equal or even excel them? No true American can reflect upon this verdict without a feeling of honest pride, not only for what has actually been accomplished, but for the evidences given of the existence among us of qualities that will surely lead to far greater and higher achievements.

But I do not allude to this subject to-day merely to indulge in complacent self-laudation, but rather to ask your attention to those points in which the exhibit of our country's progress and present position was not of so gratifying a character. Our vast railway system, our mills, our factories, our machinery—everything that requires skill and business enterprise and mechanical ingenuity, and that contributes directly to material prosperity, elicited world-wide applause. But not these alone came under searching inspection; and it would be well for us if in those things which require other and even higher qualities we had been adjudged to have done as well. It is not that in all of these matters, such as municipal organization and government; the administration of poor laws; the encouragement of art and science; the system of technical and professional education, our defects are equally glaring. But surely candor compels us to acknowledge that in regard to many such subjects, which are essential to a lasting and elevated civilization, we are still far behind-hand. As if in bitter irony, the great exhibition of our enormous progress in material prosperity coincided with a period of unprecedented depression of all business and commercial interests, and with the appearance of evils in our municipal and national affairs that seemed to threaten the very existence of our government. At no time in the history of a great nation was it ever more clearly shown than it now is among us, that for the advancement of true and enduring prosperity more, much more, is needed than inexhaustible natural resources, prodigious business enterprise, and extraordinary mechanical ingenuity. We are now realizing the supreme importance of sound principles of political economy; of habits of moderate and correct thought on matters public and private; of purity and fidelity in the discharge of official duties; of careful and comprehensive study of all those conditions which affect the physical and moral well-being of our vast and rapidly growing communities. Amid the confusion and distrust which so generally prevail, one common thought must be entertained by most intelligent people, which is that, among the influences that have led to the present state of affairs, one of the most powerful has been the want of thorough special training and preparation on the part of those to whom important duties are entrusted. The total absence of any civil service system, the self-complacent readiness with which the most important and complicated functions of government are assumed by persons utterly without training or preparation for the work, are but the most notable instances of a spirit of reckless disregard of all the sound principles of education that displays itself more or less prominently in every profession and in every trade.

I suppose that few persons who are at all familiar with the subject would be willing to express even the smallest satisfaction with the

present state of the medical profession in this country. It is true that for the past four years all branches of industry have been depressed, but the troubles that affect the medical profession have been steadily advancing and increasing for at least fifty years. Its ranks are overstocked to an unparalleled extent; there is, I believe, no other business in which so small a proportion of those engaged earn a living; it finds successful rivals among the practitioners of such exclusive schools as Homœopathy, Eclecticism, and the like; and, worst of all, it has failed to elevate its standing and repute with the public, or to exert that powerful influence upon sanitary legislation, upon public and private hygiene, upon education, and upon similar subjects which is at once its duty and its highest prerogative. I shall have occasion to adduce facts and statistics in support of some of the above statements, but I would not be understood as implying—what seems the intent of many addresses to medical classes—that the privilege of devoting himself to the welfare of humanity, to the service of the public, and to the advancement of medical science, should be the one and all-sufficing reward of the physician; while the questions of making and laying up money, or even of earning a decent support for his family are regarded as too sordid to be mentioned. It is useless to gloss over the palpable fact that the medical profession, to be on the whole successfully maintained, must be based and conducted on ordinary sound business principles. True, no pursuit calls for a larger display of the best qualities of human nature than does the practice of medicine, and I believe it will be conceded that the profession meets this demand fairly well. But the obvious motive which actuates most men who study and practice medicine is not an overpowering spirit of benevolence, but a desire to earn an honest livelihood. Hence it is but natural that they should regard the requirements, of whatever kind, that may be imposed on the medical student or the physician, not only in relation to a standard of ideal perfection, but also as they affect their own interests. But none the less is it true that, owing to the peculiar and complicated relations they hold to society, one of the most essential elements of success among medical men is the maintenance, on the part of the profession, of a reputation for high personal acquirements and qualifications, and for accurate knowledge of, and public-spirited interest in all subjects pertaining to sanitary science. With the rapid decay in superstition, and in veneration for the mysterious, the feeling with which medical science and medical men are regarded has undergone an equal change. Not only has the feeling passed away which invested the physician with almost supernatural powers, and which gave to a dose of physic the character of a fetish, but there has been a weakening of the old blind dependence upon mere title or upon mere personal or school authority. On the other hand, the vast improvements that have taken place in medical science; the great additions to the positive knowledge of disease and of the means for its prevention and cure; the widespread interest among the community concerning all physical science; the prevailing sense of the supreme importance of private and public hygiene; the constantly increasing wear and tear of our complicated social life—all of these foretell the large part which our profession

must play in the future, and at the same time attest its power. It seems likely indeed, as has been said by one of the greatest living orators*—that the influence of the medical profession, great as it now is, is destined to grow in greater proportion than that of other professions. But in order that this may come true it is essential for medical men to be thoroughly educated and fitted for their work—and I repeat what I have said, and what I well know will be endorsed by every one competent and disinterested, that in America this is far from being the case, and that the position of the medical profession here is very far from being satisfactory.

I know that it will be promptly said that I am arguing on a false basis, and endeavoring to erect a standard of excellence too high for the requirements of this country. It will be urged that the present state of the profession and the system of teaching that has led to it are natural and proper at the stage of development we have reached; and that in considering what improvements might be desirable, common business principles and the results of experience must not be lost sight of.

I know that the names of many American physicians and surgeons who, either by their brilliant achievements, or by their learned writings, have won world-wide fame, will be advanced in proof that a system of teaching capable of producing such illustrious men cannot be very defective.

Let us then proceed to a careful and impartial examination of the various questions we have thus raised. Let us not be satisfied, on the one hand, with stereotyped eulogies of a system simply because it has lasted many years and has produced a certain measure of good results; nor, on the other, let us fall into the error of decrying it as wholly bad merely because it differs widely from the methods adopted in other lands. That which is essential for us to learn is whether the plan of medical education usually pursued in this country is really the best adapted to its wants, and the best for the interests at once of the community and of the medical profession itself. It is true that a considerable number of distinguished men have been produced under this system; it is true that, when in 1861 a terrible civil war broke out in our land, a number of able medical men were forthcoming who organized a most efficient system of medical service, although it was perfected slowly and at enormous cost; but these facts, while they show clearly that we have among us many men of scientific ability and capacity equal to any in other countries, that many of these are to be found in the ranks of the medical profession as well as elsewhere, and that with such spirits no defects of education can prevent the subsequent development of talents nor the acquisition of knowledge, have little or no bearing upon the broader question we have above proposed.

The University of Pennsylvania enjoys the honor of having first established a medical school on this continent. In the year 1765, when the population of Philadelphia was only 25,000, and that of the colonies in the aggregate less than 2,500,000, and when too they

* Gladstone's Address at the London College, 18 July, 1876; Med. Times and Gaz., July 22, 1876.

had just emerged from a long and cruel war, the fame and prosperity of this institution were already so great that nearly 400 students were receiving their education in its various departments. It was at this time that its Board of Trustees, encouraged by strong recommendations from the Proprietary of Pennsylvania and from eminent physicians abroad, established the Medical Department of the University of Pennsylvania.

The plan of its organization was inspired by the two individuals first chosen to fill the position of professors, Dr. John Morgan and Dr. William Shippen, Jr., and as they and several of their colleagues had been educated at the University of Edinburgh, it was but natural that the system of education adopted in the new institution should be closely moulded upon that of its illustrious prototype. It was no idle boast on the part of the Trustees that "their scheme of medical education was to have as extensive and liberal a plan as in the most respectable European seminaries, and that the utmost provision was made for rendering a degree a real mark of Honor, the reward only of distinguished learning and abilities."* I ask you to note with particular attention the requirements and qualifications which were attached to the medical degree at that early day when medical science was comparatively undeveloped, and when our country had not yet passed the perils of feeble, struggling infancy. It was enacted (*loc. cit.*) "that all such students as have not taken a Degree in any College shall, before admission to a degree in Physic, satisfy the Trustees and Professors of the College concerning their knowledge in the Latin tongue, and in such branches of Mathematics, Natural and Experimental Philosophy as shall be judged requisite to a medical education." Two grades of degrees in medicine were established. For the lower of these, that of Bachelor of Medicine, the student was required to serve a sufficient apprenticeship with some reputable physician; to have a general knowledge in pharmacy; to attend at least one complete course of lectures, and to follow the practice of a general hospital for one year. After having shown his fitness at a private examination, he was then admitted to a public examination for the bachelor's degree. To obtain the degree of Doctor of Medicine it was necessary that the applicant should have been a Bachelor of Medicine for at least three years, should have attained the age of twenty-four years, and should write and defend a thesis publicly in the college.†

To appreciate fully the elevated standard thus erected, we must consider not only the condition of our colonies, but, even more, the state of medical science. The application of the methods of exact physical research, destined to effect a complete revolution in medical science, had not begun. Chemistry was in its infancy, for Lavoisier's great work was not published till 1773; physiology, as we understand the term, was all but unknown; normal anatomy, awaiting the discoveries of Bichat in 1800, was limited to the description of the coarser features of the different organs, while only the first rude

* Announcement in Pennsylvania Gazette, July 27, 1767.

† Unless he should be beyond seas, or so remote on the Continent of America as not to be able to attend without manifest inconvenience.

sketches had been traced of the grand science of pathology and morbid anatomy. Turning to more practical subjects, we find the science of obstetrics, which was slowly freeing itself from prejudice and contempt, in so elementary a state, that it was not until 1756 that it was introduced by the efforts of Thomas Young among the studies of the University of Edinburgh, while in the University of Pennsylvania it continued until 1810 to be regarded as a mere appendage to the subject of anatomy, and was taught by the professor of that chair. In the theory and practice of medicine and of surgery, the weight of personal authority, supported by eloquence and genius, but with scant basis of positive and accurately observed facts, was paramount. Correct diagnosis was impossible, for Auenbrugger (1761) was unheeded, and Laennec was yet unborn; and the crudest speculations filled the place of our enlightened pathology, although gleams of the coming brightness may be found in the works of Boerhaave, of Cullen, and of Rush.

In every department the limits of accurate knowledge seem to us strangely restricted, and the labors of future investigators had yet to found many essential branches of medicine and surgery, such as diseases of women and children, of the eye and of the ear; the chemistry of the urine; the use of electricity in nervous diseases; physical diagnosis, and others, all of which constitute to-day an integral and indispensable part of our system of medical education. It will be observed also that clinical teaching was inaugurated in 1760 in the Pennsylvania Hospital, and in 1770 in the Philadelphia Almshouse, now the Philadelphia Hospital, and that attendance upon this practical instruction was obligatory and continued to be so for many years, until 1845. This is not the time to dwell on the rapid development that has taken place during the last century in every branch of medical science; but you will not fail to perceive that the requirements for the degree in medicine established by the trustees of the first medical school in America in the year 1765, were such as to insure on the part of every graduate a full and sufficient knowledge of the science and art of medicine as it then existed.

I have been thus particular in detailing the mode of origin of the Medical Department of the University of Pennsylvania, because it proved to be the fruitful mother of a numerous offspring of medical schools which were established in different portions of the country. In all of these we shall find the features of the original more or less reproduced; and at all later stages of the development of the system of medical education in America the University of Pennsylvania has seemed to serve as the standard and exemplar. At every period during the last century we find a willing consideration and respect paid to her position and example, which were accorded to her not only as the oldest and most venerable, but on account of the talents and accomplishments of the long line of illustrious teachers who have ever kept her the most prominent and famous among American medical schools. Such a position and influence involve grave responsibilities. They call for incessant efforts on the part of such a school to keep abreast of the progress of science and knowledge, to improve its methods and advance its

standard of requirements so that its graduates may always fairly represent the best and wisest and most useful culture of the day. It was by the adoption of such a standard and such methods that the Medical Department of the University of Pennsylvania speedily acquired a world-wide reputation, and if subsequently this fame, as well as that of all of her imitators, has fallen lower and lower in the estimation of the world, you may rely upon it that this unhappy result has come from no lack of ability or of public-spirited devotion on the part either of the Trustees or of the Faculty of this institution, but from certain radical defects in the organization and system of our medical schools, which, instead of being corrected with the progress of time, have grown more and more fixed and flagrant. If we would learn the truth and know the estimation in which our medical education has of late been held by all other countries, it needs only to examine the changes which have taken place in their system of medical teaching proportionate to the vast advances in medical knowledge, and then to turn to the picture of our own position as drawn by those most competent to depict it.

In every country but ours, without, so far as I know, a single exception, where a system of medical education can be said to exist, certain general principles will be found embodied in that system. (See Appendix, Table IV.)

In the first place, the applicant before being allowed to matriculate as a student of medicine must, unless he have a degree from some literary college or analogous institution, pass a preliminary examination. A certain amount of general education and certain habits of study should always precede the higher and special training. But this preliminary examination by no means requires a previous collegiate course, as it usually involves only such attainments as a moderate knowledge of Latin and Greek, for which in some cases German or French may be substituted, and of grammar and composition, of arithmetic and algebra, and, in some cases, of the elements of physics or natural philosophy.

In the second place, the student is required to devote about nine months a year for four, five, six, or even seven years to his technical education before he is eligible for examination for the degree in medicine. The studies during this time are carefully graded, the first part of the course being devoted to chemistry, botany, and such other branches of the natural sciences as are fundamental to the science proper of medicine, after which anatomy and physiology, which treat of healthy structure and healthy functions, are taken up, to be followed by the study of pathology and of morbid anatomy, and later still, of the theory and practice of medicine, surgery, and obstetrics, together with that of the chief specialties. Nor is this instruction only didactic and theoretical in character, for the student is required to do practical work in the laboratories of histology, anatomy, chemistry, and pharmacy, while his personal training in medicine and surgery is conducted at the bedside in the hospital ward.

In the third place, the student is required to pass partial examinations at certain intervals, to determine his fitness to advance from one class to the next; and at the close of his studies his examina-

tion for the degree is conducted with strict impartiality by men who have no interest either in rejecting or admitting him to practice.

It will be seen, from this hasty summary, that the general principles recognized as essential and embodied in all systems of medical education but our own are: 1. An examination preliminary to matriculation; 2. A sufficient length of time devoted to medical studies; 3. Careful personal training of each student in all practical and clinical branches; 4. Careful grading of the course; 5. Impartial examinations by disinterested individuals.

In many countries the above course, if terminated by a successful examination, entitles the graduate to the degree of Bachelor or Licentiate in Medicine, with the privilege of practising his profession; while the degree of Doctor in Medicine is reserved as a mark of honorary distinction for those who, having held the lower degree for several years (three to five), choose to pursue certain advanced courses of study in philosophy, history of medicine, etc., and to stand an additional examination.

I am aware that there are some in this country who will cry out at once that so prolonged and elaborate a course of study is not necessary in America to produce good practical doctors, but that it can only tend to develop a class of over-educated, supercilious, unpractical medical men, too good and fine for the average work of the physician, and while very learned about philosophy, dynamics, and protoplasm, none the better able to order a potion or a clyster, to set a fracture, or to cut a leg off. No frame of mind is more enjoyable than the self-complacent contentment of the optimist who holds the candle of his own excellences so close to his eye that it dazzles him, and makes him blind to the broad sunlight of truth and progress flooding the world. Such objections as the above might be expected, if the elevated system of teaching which I have sketched were adopted only in one or two very old and wealthy countries, for it might then seem to be due to a highly artificial state of society; or if, on the other hand, it were found only in such a country as Germany, because it is the habit of those whose ignorance of her literature prevents them from appreciating her unrivalled achievements both in the science and art of medicine, to say that everything is there directed to mere scholastic and philosophic excellence without regard to practical success or to the requirements of daily life. But when we see that not only in older and more highly civilized and more densely populated countries, such as England, France, and Germany; but in those whose state of civilization and the condition of whose people we should be slow to regard as favorable compared with our own, such as Russia and Spain; in those, such as Brazil and Australia, whose forms of government and social system are younger even than our own; and finally even in countries which, like Mexico and the republics of South America, we are disposed to regard as only semi-civilized, and where the instability of government and the frequent convulsions of social order would seem to render any fixed and comprehensive educational policy impossible—when we see that in each and all of these a thorough plan of medical education is held essential for the welfare of the community, for the development of medical science, and for the interests of the medical profession itself, it is surely

time to consider carefully if we are not sadly at fault in this; and if, while elsewhere the requirements of medical education have been made to keep pace with the growth of medical knowledge, with us they have not been controlled by other and far less proper influences.

Nor if we consider the present state of medical science, and note the vast advances which have been made during the past century in all of its departments; if we reflect upon the enormous extent of accurate information, of minute technical knowledge, and of special practical training which is now required to fit a man to practise medicine scientifically, and to render to those sufferers who seek his help the full measure of the benefits which the healing art is now capable of bestowing, shall we be surprised at the careful and prolonged course of study that we find is imposed in all countries but our own upon the applicant for the degree in medicine. Surely no one can fail to appreciate the enormous importance of having a sufficient supply of thoroughly trained and skilful physicians. When overtaken by serious accident or illness, all other means of relief fail, and the most wealthy, the most powerful, the most illustrious must, like the poor and unknown, cast their dependence upon the skill which, under God's guidance, the physician shall display in battling with the dread angel of death, whose wings hover near at hand. No other study presents difficulties and complexities so great as those which beset the study of medicine; in no other occupation in life are such varied culture of the mind and training of the senses demanded. Yet I learn on inquiry that the average time of apprenticeship to the following trades or callings is for barbers, three years; for carpenters, printers, turners, plumbers, pattern-makers, at least four years; for machinists, five years; for pilots, seven years.

Can it be that the apprentice must practise five years before he is regarded as a skilled workman, fitted to mend or make rude machines of iron or brass, and that in this land of intelligence and common sense one who has studied medicine less than one-third that time may have his license to meddle with and make or mar that most wonderful machine—man's body—infinitely complex, gifted with boundless capacities, and freighted with the awful responsibility of an immortal soul? Can it be that seven long years of pupilage must pass ere the young pilot may be trusted in charge of a vessel to guide it through the crooked narrow channel, where only the hidden dangers of sunken rocks or treacherous shoals beset him, while in less than one-fourth of that time we profess that one may qualify himself to pilot that most precious craft—a human life—through the long, dark, intricate windings of disease, where at every turn death lies concealed, so close at hand and so difficult to avoid that nothing but the most consummate skill can insure safety? A strange-seeming contrast, and yet the following careful examination of the state of medical education as it exists in all the medical schools on this continent, with a few honorable exceptions, fully supports the paradox.

In the first place, no examination whatever is required preliminary to matriculation. It is important that correct ideas should

be held as to the intent and value of such an examination. It is by no means designed to restrict the study of medicine to those who are fortunate enough to have enjoyed a collegiate education. But as it is necessary to compress the purely technical studies into as short a period as possible, and as certain habits of application and a certain amount of general education are requisite to enable the student to pursue to the best advantage the studies of the medical school, it is in the highest degree important that he, unless already a graduate of a literary college, should be expected to pass a preliminary examination on the elementary branches of a general education. The absence of such a preliminary examination in our system is therefore a grave defect, and one which operates as much against the interest of the student himself as it does against the average qualifications of the profession. I regret to say that in the recent changes made in the curriculum of medical studies at this institution it was not deemed feasible to institute a preliminary examination at present; but it is clearly recognized that such an examination is essential, and it is the intention to establish it at the earliest possible date.

2. The period of study is utterly, nay ridiculously, inadequate for the purpose. By the year 1811* the original requirements for a degree in medicine in the University of Pennsylvania had been modified. The degree of Bachelor of Medicine had been abolished, and the following was the rule as to the degree of Doctor of Medicine: "No person shall be admitted as a candidate for the degree of Doctor in Medicine, until he shall have attained the age of 21 years, nor unless he shall have applied himself to the study of medicine three years, two of which shall have been in this University; nor unless he shall have attended the Pennsylvania Hospital during one session at least, and also have attended the practice and been the private pupil of some respectable practitioner." Already in the first forty-five years the baneful influences that we shall have to study had caused a lowering of the standard of education; but if we compare the requirements of 1811 with those of the present day, a still further fall is apparent.

In the announcements of most American colleges the above phraseology is still preserved as nearly as may be; but in reality the student is only *required to attend two courses of lectures each of less than five months' duration* (115 to 122 days' actual teaching). No supervision whatever is maintained over the occupations of the students in the interval between the courses, and it is not to be wondered at that very many of them should either yield to the temptations of pleasure and ease, and pass these months in idleness, or else should be led by the actual need of money to pass them in some such occupation as school-teaching or harvesting, so that, as a matter of fact, the total length of time given by many, very many students exclusively to their medical education previous to graduation does not exceed eight or nine solid months. It is true that, all the

* Rules enacted by the Board of Trustees of the University of Pennsylvania, Jan. 21, 1811. See Carson's Hist. of Med. Dept. of Univ. of Pa., 1869, p. 117.

while, students are advised to study three years, and certain trifling inducements are held out; but since, as I shall show further on, the course of instruction is so arranged that they cannot gain much by so doing, only a small proportion will be found to thus voluntarily lengthen their term of studies. It is also true that, within a few years, courses of lectures during the spring months have been organized in connection with a few schools, to afford occupation for such ambitious students as actually themselves desire to receive more thorough and prolonged instruction than is regarded by the Faculties as sufficient to qualify them for the receipt of the honor of the Doctorate and for the practice of their profession. But as attendance on such instruction is not compulsory, and as no examinations are held upon the subject-matter of the lectures, it must be admitted that while it is well that such extra opportunities should exist for those who are anxious to profit by them, they are not to be regarded as forming any essential part of the system of medical education, or as contributing to defend it from the grave charges of utter inadequacy which are brought against it.

In some schools the student is required to enter his name as a private pupil in the office of some respectable physician, but in too many instances this is a mere formality; the student paying a small fee for the privilege of calling the physician his preceptor, but receiving from him in turn none of the personal practical instruction which in olden times made this relation of preceptor and pupil really compensate in part for the want of a regular collegiate education.

3. In the next place, the lectures are exclusively didactic, certain branches being illustrated more or less copiously with experiments or models, according to the resources of the school and the ability of the teacher. Each annual course is, as a rule, the mere repetition of the preceding one. There is, of course, no means of enforcing attendance on these lectures, and the student who has paid for his ticket may attend few or many of them as he chooses, assuming the risk of cramming at the close, so as to be able to pass the final examination.

In the schools of the better class the student is obliged, or at least expected, to dissect each part of the human body, but apart from this, no practical work whatever is required of him. There is no laboratory-teaching in chemistry or pharmacy. The use of the microscope is not taught, nor is any opportunity afforded to become familiar with morbid anatomy. But far worse than this, the attendance on clinical teaching has now for a long time not been compulsory. In many of the towns which are honored as the seat of a so-called medical university, it is true that the population is so small that it were impossible for any hospital to exist of sufficient size to support any clinical instruction worthy of the name. But even in the larger cities, where there are ample clinical facilities, it is left altogether to the choice of the student, already overwhelmed and over-crammed with didactic lectures, whether or not he will attend a single clinical lecture during his entire course of studies. The mode of conducting this essential part of medical education is so superficial, moreover, that not even if a student sedulously avail

himself of it can he really obtain much personal knowledge of practical medicine.

"Clinical" means "bedside," and clinical teaching, honestly and fairly so called, certainly means that the student shall be taken to the bedside of the sick and injured, and there be himself taught the practical skill needed for the diagnosis and treatment of the disease. On the other hand, to use a fair illustration of the sort of clinical teaching which prevails, to bring a case of disease of the heart before a class of one, three, or five hundred students, to gravely place a stethoscope on the chest, listen attentively and announce that there are certain unhealthy sounds audible, and that, therefore, such and such a morbid condition exists, is a poor way of teaching those students to detect heart-disease themselves. It is the discovery of this wonderful means of diagnosis, auscultation, and of its associate, percussion, that has done more than anything else to make modern medicine what it is. There is scarcely any case of disease in which it is not important or even essential to make use of these means to determine fully the nature of the affection. Yet no opportunity is given to the student to practise them and become familiar with them. He is not required before graduation to show any proficiency in their use; and, in fact, the vast majority of American medical students receive the degree in medicine without ever having felt a sick man's pulse, or listened to the sounds of the lungs or heart. Many other illustrations might be given, drawn from the arts of medicine, surgery, or obstetrics, but they would only exemplify the same fact.

It is true that the enterprise of specialists and the growth of clinical facilities have led to the establishment of special courses of practical instruction in the spring months, or during the winter months, at such hours as will not interfere with the official instruction; but an extra fee is naturally attached to all such courses, and as it is not obligatory upon the student to take any of them, it is needless to say that a very small proportion of the class actually profits by these special advantages. Who could become a skilled musician merely by listening to elaborate expositions of the theory of music and to the brilliant performances of some eminent master? What better chance have the students in the average American medical colleges of learning their art by merely attending courses of didactic lectures and public demonstrations of practice?

4. The next defect in the system pursued in most American medical colleges, is one which, I think, will strike the ordinary mind as the most absurd of all. It is that there is no grading whatever of the classes. Picture to yourself a medical class of several hundred students. Some of them have already devoted two years to the study of medicine, and are familiar with technical terms, with the elementary branches, and to a certain extent with the more advanced subjects; while others have studied but one year, and are correspondingly uninformed; and others, again, fresh from the high-school, the academy, the farm, or the backwoods, now for the first time find themselves in a medical hall, and hear a language almost utterly unknown to them. Yet all of these sit side by side, and listen to precisely the same instruction. This plan compels

the teacher to repeat year after year the same course of lectures, in order that each successive crop of students may begin at the beginning. But it compels him, also, either to lower his teaching so far towards the level of the understanding of the most ignorant, as to sadly waste the time of the further advanced; or else to address himself to the latter portion of his class, and thus allow the new-beginners to flounder along for awhile, overwhelmed by the flood of new terms, by the constant allusions to unknown antecedents, and by the inherent difficulties of the higher branches of medical science. No middle course is possible by which both of these great evils may be avoided, and either of them is of grave importance.

No term-examinations mark or check the progress of the student through this imperfect and inadequate course of education, and when he comes up for final examination for his degree, it is with a sublime confidence in his success, that is as much justified by the almost universal result as it is little merited by his qualifications. It is before no strict, impartial, and unrelenting board of examiners that he appears to rest his chance of success solely upon his merits, but he comes rather before the indulgent members of a business corporation, to whose pecuniary success he has directly contributed, and who are well aware that they cannot afford to acquire the reputation of holding too high a standard or of being too strict to mark what is said amiss, since upon the gratifying success of their students, and the ever-widening circle of their graduates, must depend their classes in the future. I may safely assert that in the most firmly established schools, the proportion rejected does not exceed 1 in 20 to 1 in 50 of the applicants; while I know that in the case of schools still struggling for success, it is almost unknown to find a single student who has not succeeded in twelve or eighteen months in meriting with the highest honor that degree which in other lands the ablest men are proud to receive after four, five, or six years of incessant toil. This results from the fact that in most American medical colleges no fixed salary is attached to the professorships, the incumbents of which are left to derive whatever profit they can from the fees of the students. It is possible that this arrangement, which, like so many other features of the original system adopted by the Medical Department of this University in 1765, was borrowed from the University of Edinburgh, may have been and may still continue to be comparatively harmless in a country where an intelligent and powerful government exercises supervision over the interests of education, but its influence has been most pernicious in America. In the first place, it created the anomaly of medical schools and universities, nominally under the control of boards of trustees or directors, but in reality almost exclusively under the management of the faculties. This state of things would naturally follow where the faculties are dependent for their profit upon the success of the school, since it would seem invidious for a board of trustees to insist upon any change in the policy of the school unless they were prepared to indemnify the members of the faculty for any reduction in the size of the classes and consequent diminution of their profits that might follow. Thus it has resulted that our medical schools are, to all intents, private

business corporations, frequently trading under the sanction of a board of trustees and the dignified title of university, but in reality conducted in the interests, not of the medical profession, not of the community, certainly not of medical science, but of the members of the faculty alone. "This it is," as was eloquently said by one of my colleagues, "which has destroyed the independence of the schools, and has compelled them to perpetuate a system of education which their judgment condemns and their conscience reprobates."*

In the second place, this pernicious system of remunerating medical teachers stimulated to an unheard-of extent the multiplication of medical schools. If it had been possible here, as in all other countries, for the general government to restrict the number of institutions privileged to confer the degree in medicine, and at the same time to insist upon a steady elevation of the standard of education, the dependence of professors upon the students' fees would have been of comparatively little consequence. But the exercise of such control would not only have been impossible, it would have been hostile to the spirit of our people and to the principles of our national government. Accordingly, when the oldest and most distinguished schools set the example of adopting the system I have just denounced, it is not surprising that others should have followed it. Under this system it requires no capital to go into the business of making doctors. No permanent endowment fund is required, the interest alone of which is to be expended in the payment of fixed salaries, while the fees may, in part at least, be devoted to improving the facilities for instruction, or to founding scholarships for poor but meritorious students. No such elements of permanence and independence characterize the numerous brood of medical schools which have sprung into existence during the past half century. A number of physicians determine to start a new school in some city or growing town; a charter is readily obtained; the classic seven branches are amicably distributed among themselves; twelve or twenty-four respectable citizens are easily found who are willing to serve on a board of direction; a suitable building is bought or rented; the press is made liberal, use of to announce the birth and vaunt the special attractions of the new member of the sisterhood of medical schools; and the work of teaching begins.

The professors themselves are in part remunerated by the prominent position which they acquire among the local profession, and further, by the widespread notoriety which is given to their names by the constant advertisements in the medical press. When to these influences is added the natural tendency of the graduates of any school to call their former teachers in consultation in all emergencies, it will be understood that in most cases the possession of a professorship is a guarantee of a lucrative practice. The only direct receipts of the school are the fees of the students; and thus the faculty is urged by every argument of self-interest and vanity to spare no effort or expedient by which the size of their classes may be augmented. The

* A. Stillé, M.D. Address before the Society of the Alumni of the Medical Department of the University Pennsylvania, 1878, p. 20.

natural and proper mode of attaining this end would seem to be by improving the character of the instruction, and enlarging the facilities of education so as to render the school more renowned and attractive than its rivals. But this would involve so heavy an increase in many items of expense that it would be easy for less scrupulous schools to underbid and offer to the student a diploma for less money. Nor can we blame the students if, in ignorance of what a professional education should be, with no influence exerted on them by the government, and with a seeming utter indifference on the part of the public and the profession, they should go whither they can obtain what they seek at least cost. Hence it becomes necessary, under the working of inexorable laws of trade (which are but one expression of the fundamental principles of human nature) for each college to keep down the cost of its diploma ; the length of time required to obtain it ; the standard of requirement, and the severity of the examinations, in order that it may compete successfully with its neighbor. The extent to which this will be obligatory will be governed by the closeness of the competition and the degree of over-production which exists. In order to give an idea of the effect which has been produced on medical education by this process, it is sufficient to place before you the figures showing the rate of increase of medical schools. (See Table I., Appendix.)

Following the establishment of the Medical Department of the University of Pennsylvania in 1765, came that of the Medical School of Harvard University in 1782, and that of Dartmouth College (New Hampshire Medical Institute) in 1797. The next decade witnessed the establishment of 4 regular medical schools ; 6 more were started between 1819 and 1826 ; 3 between 1829 and 1834 ; 10 between 1837 and 1846 ; 10 between 1847 and 1856 ; 8 between 1857 and 1866 ; and no less than 21 between 1867 and 1876. In addition to these, many schools were started but, after a continuance of longer or shorter duration, were disbanded. Of these no note has been made, the above statement being based upon the statistics of schools now in existence, published by the Department of the Interior in 1876 and 1877. In 1765 the population of the colonies in the aggregate was less than 2,500,000, and that of Philadelphia was about 25,000. During the next 100 years, while the population of the United States increased to about 35,000,000, or 14 times, the number of regular medical schools rose from 1 to 44, with, in addition, 6 Homeopathic and 4 Eclectic Schools, 6 Dental Colleges, and 6 Colleges of Pharmacy. Between 1867 and 1876, the population of the United States increased less than 8,000,000, but, as we have seen, no less than 21 new regular schools of medicine were established. It cannot be questioned that there should be a more or less definite relation between the number of medical schools and the extent of population. This is true in all countries, but especially is it so in America, where nearly all the schools receive no extraneous aid or support, but are dependent solely upon the number of students in attendance. It appears from Table V. (see Appendix), that on the average it has not been found desirable to establish more than one medical school for every 2,000,000 to 4,000,000 inhabitants. This is true not only of thickly peopled countries, such as France and

England, but of countries of vast extent and comparatively sparse population, such as Brazil and Russia. I am at a loss to find any valid reason why a law that holds good all over the world, save in America, should be subject to any exceptions here. Yet, as we have seen, there are to-day in this country with a total population of about 45,000,000, at least 65 regular schools of medicine, in addition to 11 Homœopathic schools; 4 Eclectic colleges; 14 colleges of Pharmacy; and 12 Dental colleges. As the druggists are in most places largely engaged in the practice of medicine, we may therefore estimate that in this country there is one medical school for, at the most, every 500,000 inhabitants.

The influence of protection upon educational institutions is very different from that which it exerts on manufacturing industries. Had it been possible for the government to have extended its protection to our system of medical education at an early stage, and to have aided in the establishment of a limited number of thoroughly organized schools in different sections of the country, with the condition imposed of maintaining a proper standard of education, the medical profession of America would never have fallen to the low estate it has reached. Unfortunately such protection was impossible, and without it, and stimulated by the peculiar causes I have tried to expose, the evils of unlimited competition have shown themselves in their worst forms. Many schools have been established in places which are entirely unsuitable for the purpose, owing to the absence, among other things, of proper clinical facilities; and, without any disrespect be it said, many schools have been established by persons entirely unfitted for the work. Still, as each school was duly authorized to confer the degree of Doctor in Medicine, and as it is impossible for the public to decide off-hand between those physicians who have received a thorough education, and those who have not, as they can between good and bad butter or bread, the schools have joined in the ruinous policy of reducing their fees, shortening their term of studies, and lowering their standard of requirements in order to avoid being underbid by their rivals. So powerful has this influence been that, when in 1846, in accordance with the earnest recommendation of the American Medical Association, the University of Pennsylvania extended its session of medical studies to six months, not a single other school followed its example. But I declare that there are few events in the history of this venerable University of which, as one of its sons, I am more proud than of this brave attempt to fight single-handed the growing degeneracy of the American system of medical education; and I should be yet prouder of her if, instead of sorrowfully abandoning her advanced position after six years of steadily diminishing classes, she had thrown down the gauntlet to her rivals, instituted preliminary examinations, insisted upon three years of actual collegiate study, and retained the prolonged session of lectures. Pecuniary loss for a few years she would doubtless have incurred, but long ere this her example would have led to a general elevation of the standard of medical teaching throughout the land, and would have put a stop to the excessive multiplication of poor medical schools which we now have to contend with.

After what has been said, it will not, I think, be gainsaid by any that the following points are in reality grave defects in the American system of medical education: 1, the absence of a preliminary examination; 2, the very short term of studies required; 3, the want of personal training in the practical branches; 4, the absence of any grading of the curriculum; 5, the examination of the candidates for the degree by those having a direct pecuniary interest in their success.

It would be easy to exhibit to you the bad influence which this defective system of education has exerted upon the development of American medical science; but I must limit myself to a consideration of the effect it has produced upon the standing and success of the medical profession, a question which is of the utmost practical importance to each one of you who looks forward to gaining an honest and honorable livelihood by the practice of medicine. I know that there are some who hold that the existing state of things, being the result of the free and unfettered operation of the laws of supply and demand, is natural and therefore admirable; and that there are others who have even brought themselves to believe that both the public and the profession are well satisfied with things as they are and do not desire any changes. But unfortunately such views cannot controvert the clear facts of the case; nor do they help to remedy the evils which they blindly ignore. The first, if not the greatest of these evils which has resulted from our degraded system of education is the enormous over-production of medical men. The unprincipled competition between the schools to secure the largest classes of students, and the easy rates at which diplomas are obtainable, have stimulated extraordinary numbers to study medicine. By a curious coincidence, moreover, the great series of events that have transpired in America during the past fifteen years have all tended to produce a similar effect. The civil war, which broke out in 1861, soon attained such gigantic proportions that, both at the north and south, a large increase in the number of medical men was necessary to supply the demands of the army and navy. Following the termination of the war in 1865, came a period of inflated prosperity, when the development of our country progressed at an incredible rate. The tide of immigration was setting like a mighty flood towards our shores; our railroad system was stretching its iron threads in every direction, weaving its wonderful network at the rate of 5000 miles a year; every day witnessed the establishment of new centres of mining and manufacturing industry, or the opening of new fields of agricultural wealth throughout the land; villages and even towns sprang into existence as though at the touch of a magician's wand. Side by side with this marvellous expansion, came an equally rapid growth in the numbers of the medical profession. There was already enough, and more than enough, of unemployed medical talent in the cities and large towns that should have been drawn upon to supply the new demand, but none the less briskly went on the work of multiplying medical schools and of glutting the market with hastily manufactured doctors.

In 1873, over-production and excessive development had reached a point of such extreme tension that it needed but a slight jar to

less, or 1.25% the former percentage of the students. The total number of registered students were 10,000 and for the ranks of medical students. This does not mean that the number has changed significantly, but it is the new method of calculating the percentage is. The method used is that the percentage finding a place in a college is that place is to the total that is not a place of residence and it does not mean that the chances of getting a living would be better in the former method of calculating. The numbers were as follows: total registered students of the two faculties respectively, followed by the number of medical students. There are the students of each of the medical schools. There are the students of each of the medical schools. The numbers of the total students that have not been registered and the size of the graduating classes has been indicated. The returns of the 1950 census of Education in 1950. Washington, D.C. is the following in the annual publications of the U.S. Register Medical Schools in that year there were 10,000 graduates. No returns were received from several schools so that the total number must be placed at a figure even higher than this. There were just 2,000 graduates in 1950 of the 10,000 students of Washington. In addition there were 2,000 graduates in the 4 medical Colleges and about 2,000 graduates at the 10,000 non-medical Colleges. In the Washington area it is within sufficient to estimate the number of practitioners of medicine who were qualified in 1950 as something over 1,000.

Now it is true that a physician shall be able to earn his living from the practice of his profession. It is evident that there must be an adequate number of persons who are qualified to do this. There are great numbers now inhabiting every part of our social organization. Marriages, births, deaths, even sickness and illnesses are found to stand in certain definite proportions to population and so will it be found taking one year with another, that each individual needs a certain definite amount of medical service. Of course in certain places where the climate is bad and the patients of the institutions areaptions to health, there will be more sickness than where the conditions of life are more favorable. Of course also it is possible for a physician to attend a much larger number of persons in closely settled districts or in cities than in localities where the population is very sparse. But still taking the health and health of the population considered, it may be said that one thoroughly qualified medical man can illustrate effectively and in turn be fully supported by a population of from 10,000 to 20,000 persons. The ratio of this is fully established by Table II, see Appendix, which have prepared by all the returns of the U.S. Department of Education and also the annual returns of medical graduates in various countries of very different social and economic.

It will be seen therefore that the annual returns of the ranks of

* Dr. J. M. Turner of Washington City, is a very competent "Statistical Officer of the Medical Profession in the United States." *Journal of Medical Statistics*, May, 1951, page 1, estimates from data contained in the Census Report for 1950, that, in addition to all the graduates, the number of foreign born and educated physicians is not less than 200 annually (220 per annum from 1940 to 1950).

the medical profession in America (2000)* would properly correspond with an annual increment to the population of from three to four millions, while actually the yearly increase is not more than one million.

It is difficult to estimate the total number of practitioners of medicine in the United States, but from the most reliable data I can obtain, it may be calculated that there are not less than 60,000,† so that, if the population be taken at 45,000,000, there must be at least one medical man to every 750 inhabitants. In some of the States indeed the proportion of physicians rises as high as 1 to 600, 500, or even 400 inhabitants (see Table III., Appendix).

In a most suggestive little article‡ Sir James Paget has given us his personal knowledge of what became of 1000 of his pupils within fifteen years of their entrance at St. Bartholomew's Hospital, and it appears that not more than three out of every five succeeded in establishing themselves in even fair practice. A small number of the fortunate ones achieved great success, but the great majority only a moderate degree; while the remaining two-fifths had either very limited success or failed entirely, or else died. The system of medical education in England has been, until very recently, very defective, and there also the profession is much overstocked. But the 1000 students whose career Sir James Paget records, may fairly be taken to represent the best class of medical students who had enjoyed educational advantages above the average, and yet the result can scarcely be considered as encouraging. It is said that Abernethy, in looking round at the crowd of pupils at one of his introductory lectures, exclaimed, as if with painful doubt, "God help you all! what will become of you?" What words of apprehension and anxiety could express the feelings of that honest nature if he

* Making allowance for an annual mortality among practitioners of medicine of 1000, which is certainly a liberal estimate.

† The Medical Register and Directory of the United States, published by Samuel W. Butler, M.D., in 1877, gives the addresses of over 50,000 practitioners, regular and irregular as well. It is, however, certain that a considerable number have been overlooked, though it is impossible to make any calculation of such omissions. The United States Census Report for 1870 gives the total number of practitioners of medicine as 62,383. This, however, included all who chose to represent themselves as physicians, and probably many not actually engaged in medical practice were registered. Since 1870 there have been not less than 17,500 to 20,000 members added to the profession, while the annual mortality, which, according to the same Census Report, amounted to 947, would not have occasioned a total reduction of more than 8000. Undoubtedly also many practitioners have abandoned the medical profession for other occupations. But making full allowance for all of these, it seems within safe limits to fix 60,000 as the probable number of practitioners of medicine in the United States and Territories at the present time.

Further, it is well known that it is an almost universal custom in America for druggists to prescribe over their counter, and thus to conduct a medical practice often of very considerable size. According to the Census Report of 1870, there were 17,369 druggists and traders in medicine. On the whole, I do not believe that the actual practitioners of medicine throughout the United States bear a lower proportion to the population than 1 to 600.

‡ What becomes of Medical Students? St. Bartholomew's Hospital Reports, vol. v. 1869, p. 238.

were to behold the throng of 3000 graduates who leave our medical schools each year—so ill fitted for their work?

Within the past few years the complaint has been more and more frequently heard that professional incomes, previously small indeed, have been dwindling away at an alarming rate. The complaint is not an unfounded one; the profession at large are awakening to the fact that its ranks have been fearfully overstocked by the reckless selfishness of the medical schools; and I make bold to assert, well knowing the unparalleled depression of all business interests, that there are but few classes of the community of which a larger proportion are not earning a living than of the medical profession.

There is but one remedy for this state of things, but before I touch upon it, let me remind you that the excessive number of medical men is not the only evil that has resulted from the state of our medical education. We find other evils inseparable from the first, and augmenting its bad influence in the lowering of professional tone, the diminution of public confidence, and the prevalence of open unblushing quackery. It is known to all men that for years the representative medical associations have loudly denounced the system of education in our medical schools; that for years the leading members of the profession have acknowledged its defects and urged an immediate reform; that for years the pages of the most influential medical journals have overflowed with eloquent appeals and unanswerable arguments in favor of an elevated standard of education. In vain—the downward course is ever the easiest; and at last the lowering tone of public and professional sentiment has brought its natural and inevitable result. Medical diplomas and degrees, conferred by “bogus” universities, can be openly bought for 50, 30, even 20 dollars, without attendance on a single lecture or without the pretence of the slightest medical knowledge. The public has no way of distinguishing the owners of these letters of marque from the duly commissioned physician; and now, to our shame be it said, scarce a month passes without the exposure, in some of the leading foreign papers, of cases of horrible malpractice by ignorant quacks holding a “bogus” American diploma. I have so often met with the heading “American Medical Diplomas in Court” in the reports of criminal procedure abroad, that the very words have an ominous and deadly sound to me.

The unscrupulous and unprincipled adventurer, the impostor and the quack, the men who have failed to pass the foreign examination boards, all of these flock to the United States as to a field where, without restriction, they may assume the title of physician and practice on an equality with the regular profession. Is it any wonder that, while these flagrant abuses exist, and exist without united and determined efforts on the part of all true medical men to stamp them out, and to elevate our own standard so that it shall no longer serve as a cloak for ignorance and incompetence, is it any wonder that public faith wanes and grows dim, that quackery and imposture of all kinds flourish like rank weeds, and that nostrums and patent medicines possess a share of public confidence far larger than ever before?

A third evil, of serious and rapidly growing magnitude, interferes

with the success of the practitioners of medicine; and this too is largely due to the excessive multiplication and suicidal competition of our medical schools. In the numerous cases where a medical school is started in a town so small that it needs no hospital of sufficient size to furnish material for clinical instruction, the only course open for the faculty is to establish a free dispensary, where applicants can obtain advice and medicine gratuitously on condition of appearing before the medical class and serving as the text for a clinical lecture. This is rarely objected to, and in nearly every instance the free dispensary succeeds famously and soon numbers among its patrons a considerable proportion of the community. But it is not only in smaller towns, but in great cities as well, that a free dispensary comes to be regarded as the necessary feeder to the clinic of a hospital or medical school. In New York, in Philadelphia, and in other large American cities, the attendance at dispensaries has already reached prodigious dimensions. But one result can follow from the unlimited development of this free dispensary system. At first the attendance is chiefly confined to the really poor, but as the reputation of the dispensary spreads, a better class of patients apply, and finally there are found, among the throngs who crowd the waiting-room, large numbers of well-to-do people, fully able to pay a moderate fee for medical advice, and who would scornfully resent the proposal that they should beg for any of the necessities of life. Yet it is practically as mendicants that they appear at the dispensary, and thus by slow degrees these institutions exert a pauperizing influence on a considerable portion of the community, and interfere most seriously with the legitimate business of the medical practitioners. In London, the rivalry of the medical schools, with the inseparable desire on the part of each to offer the most extensive clinical advantages, has fostered this injurious system of free dispensaries, until, as Sir Charles Trevelyan asserts, not less than one-fourth of the population depend on gratuitous medical relief. At this moment the profession at large are up in arms against it there, and it is evident that in America also the evil is rapidly approaching a stage at which some restriction must be imposed upon it.

I have thus sketched for you three serious impediments which stand in the way of professional success. I have not alluded to the difficulties of medical science itself. I have not dwelt upon the grave responsibilities of the life and work of a physician. All this has been done often enough by more eloquent voices than mine. I have confined myself to the consideration of that humble and unattractive topic—yet which I assure you is the fundamental and essential one here as in all occupations—of the difficulties in the way of earning a living in the practice of medicine at the present time.

The three chief obstacles to which I have alluded are: 1. The excessive overstocking of the profession; 2. The prevalence of quackery, and the diminution of public confidence; 3. The abuse of medical charities. And I have given you my reasons for holding that all of these are inseparably connected with, and to a very large extent dependent on, the needless multiplication of medical schools, the excessive competition for classes, and the degraded state of

medical education. Is it possible that any one familiar with these truths can say that reforms in medical matters are not desired either by the profession or by the public? On the contrary, I can assure you from the testimony of hundreds of competent authorities, that the time has arrived when both the profession and the public are prepared to demand that reforms—yes, extensive reforms—shall be made in the American system of medical education. But in the approach of this, as of all true reforms, although the daring assaults of impatient leaders may, for a time, seem to fail utterly in making any impression upon the strong barriers of established custom and vested interests, there is a silent and gradual development of public opinion and conviction which at last attains a power that sweeps down all opposition.

“Thus, while the tired waves, vainly breaking,
 Seem here no painful inch to gain,
Far back, through creeks and inlets making,
 Comes silent, flooding in, the main.”

I should, however, but half discharge my duty to you if I stopped with this gloomy review of the present position of the medical profession in America. I must endeavor, also, to point out the way in which it can best be remedied, and particularly the course which seems wisest for all students of medicine at present to pursue.

There are two plans which have suggested themselves for securing the desired elevation of the profession and of medical education. The first of these is that those colleges which choose to do so should provide for a thorough post-graduate course, which should be equivalent to the course of instruction in European medical schools; and that upon those students who should successfully pass through this course, a second and higher title should be conferred. It would not make much difference what title was chosen, provided the public should come to recognize its significance, and to regard those physicians who were entitled to it, as of a higher grade than the rest, better and more thoroughly fitted for their work, and therefore deserving of more confidence. This proposal certainly commends itself by its simplicity and ease of execution, but there are several considerations which make me doubt if it would produce the desired effect.

The most serious objection is, that if such a supplementary title were adopted, the degree of M.D., with the license to practise, would continue to be conferred on those who merely complied with the present requirements for that degree. Thus, after pretending to reform medical education, it would still be necessary to assume that students were fitted to graduate and enter into practice after a course of instruction which is now, with good reason, charged with being utterly inadequate.

Moreover, it is to be feared that it would be difficult to get the public to understand the real practical difference between one who was a mere M.D., and one who had acquired the additional and higher title. Yet it would be essential that this should be clearly done, in order that the physician, who had incurred an outlay far greater than ordinary for his diploma, should be remunerated by a

larger degree of public confidence, and by more rapid success in practice. Nor would this be rendered easier by the fact that, in those countries where two degrees in medicine are conferred, the lower degree is that of Licentiate or Bachelor, for which from four to six years of study are requisite, and which confers the full right to practise. The degree of Doctor of Medicine is there the higher title, and bestows a certain amount of prestige upon its possessor, so that he would naturally be preferred, other things being equal, to a mere licentiate or bachelor. In addition to this, it is necessary in many countries for any medical man who aspires to official or academic appointments, to obtain the degree of M.D. It seems probable that the exceptional honor attached to this latter title abroad, would add to the difficulty of degrading it here to the second place.

It may also be anticipated, that if one or two important colleges were to agree upon such a supplementary degree, it would be a difficult task to induce other schools to refrain from offering some analogous degree on easier terms, or even from underbidding, as heretofore, by offering the same degree for a much lower grade of acquirements.

Finally, it is evident that, just as we now find the degree of M.D. openly sold for trifling sums, or even deliberately assumed by many who have no right whatsoever to it, this proposed higher degree would soon become an article of illicit traffic, and be bought or forged by the same class of quacks and impostors who now prey on a credulous community.

As it seems impossible by this method either to advance the average education of the graduates in medicine, or to protect those who should acquire the higher degree, it is necessary to seek some other plan. Nor, when all the difficulties of the question are taken into account, does it seem possible that any can be successful which does not involve the intervention of governmental aid. It is manifestly impossible for the national government to undertake the supervision of the whole subject, and, with the advice of experts, to lay down definitely the character of preliminary examination, the duration of study, and the arrangements of the curriculum necessary for all applicants for the doctorate; and to appoint boards of examiners, before whom all such applicants should appear, in order to stand a fair and impartial examination. But that which may not be done by Congress for the whole country, can readily be done by the Legislatures of the several States. There would seem to be no insuperable difficulty in framing a law which should prescribe the number of years to be devoted to medical studies before graduation, and which should further provide for the creation of a State board of examiners, who alone should have the right to confer licenses to practise within the limits of that commonwealth. By this simple means all medical schools, regular, homœopathic, or eclectic, would be compelled to provide such a course of instruction as experience and sound reasoning approve; and the qualifications of all applicants for the license to practise would be passed upon by an impartial board having no direct personal interest in the result. I am entirely in accord with the views which my colleague, Prof. H. C. Wood, has expressed on

this vitally important subject,* and I feel with him that the existence of so-called medical sects offers difficulties in carrying out this plan which are far more imaginary than real. The method which has worked successfully in Canada could probably be applied in the United States, viz., "To a board which examines in all such branches of medical science as are common to all the sects, might be appended supplemental boards, which should examine in therapeutics only, the candidate selecting at will the representatives of the regular, homœopathic, or eclectic system." This plan would apparently meet all the requirements of the position. It would not interfere with the medical colleges, which would still confer the degree of M.D. precisely on such terms as they chose to do; but it would compel all those which aspired to graduate medical men, thoroughly trained and fitted for their responsible work, to adopt reforms in their system of education analogous to those upon which I have dwelt. It would absolutely exclude from the State which should adopt such a law all quacks and impostors, and, no less, all half-educated, incompetent medical men. It would afford proper protection to the community in one of its most vital interests. It would afford protection to the medical profession by aiding to prevent the excessive overstocking of its ranks, by excluding the uneducated and the unprincipled, and by favoring a return of that firm confidence on the part of the public, which is our surest support. It would be to the advantage of the medical student, because, while rendering it more expensive and difficult to obtain the degree, and license to practise, it would insure to the successful candidate ten-fold greater chances of subsequent success than he now possesses. I have not attempted to go into any of the details of such a measure, because it will be time enough to do that should it come before the public in a practicable shape. There is little doubt that its adoption would be strenuously opposed by all the representatives of a lower grade of medical education, but if its operation would be attended with great advantages to all classes, it does not seem too sanguine to hope that some such measure may be enacted ere long.

But for you, as well as for all those who believe that a more thorough system of medical education is an urgent necessity, it is essential that immediate action should be taken. While public and professional opinion is developing and shaping itself upon the larger modes of dealing with these questions, it is possible for the medical schools themselves to take the initiative. The time has come when it is necessary to do so. The time has come when those schools which would be true to themselves, to their Alumni, and to the weighty interests entrusted to them, must make an advance in their system of education. Not only in the interests of medical science, not only in the interests of the community, but in the interests of their students, must this be done, in order to qualify these to win public confidence and to succeed in the hard struggle that awaits them. I speak solemnly to you, because I feel the grave responsibility of uttering such advice; but, from my inmost heart, I assure

* Lippincott's Magazine, Dec. 1875, p. 710. "Medical Education in the United States."

you that in the present state of the medical profession your only sure road to practical success lies, not in securing your diploma where it can be had most easily and quickly, but in securing the very best education that can be obtained.

It is not to be expected, for it is not possible, that there should be immediately instituted in this country a system as full and elaborate as that which exists in foreign countries. But it is absolutely necessary that certain moderate but vital changes should be made in our system as it now exists. Those of you who remember what has been said of the chief defects of this system will readily suggest the needed reforms. They are as follows:—

1. The establishment of a preparatory examination.
2. The lengthening of the period of collegiate studies to at least three full years.
3. The careful grading of the courses.
4. The introduction of ample practical instruction of each student both at the bedside and in laboratories.
5. The establishment of fixed salaries for the professors, so that they may no longer have any pecuniary interest in the size of their classes.

It is useless to continue to heap, one on another, additional facilities which may be taken advantage of or not according to the inclination of the student. Public attention is at length fully aroused, and you may depend upon it that very soon public confidence will be bestowed on the diplomas of those schools only which guarantee that every graduate who leaves their halls has received a full, thorough, and practical medical education.

I have told you that in 1846 the University of Pennsylvania, whose medical department is the oldest medical school in America, made an unsuccessful attempt to elevate the standard of medical education; and now, when the fulness of times has arrived, it is but fitting that she should again come forward as a leader, and take the position to which her venerable age and illustrious record entitle her. But the honor of having been the first to adopt the essential reforms which I have just enumerated fairly belongs to the Medical School of Harvard College. In 1871 the authorities of this great University, which most justly ranks first among American literary schools, determined that the system of education in the medical department should be reformed, so as to place it on the level of the other departments. There, as elsewhere, the plan met with the strongest opposition, and there were not wanting many who prophesied its early and humiliating failure. But in spite of discouragement and opposition, the needful reforms were instituted; and already, in the course of six years, the school has reached a degree of brilliant success that it never before enjoyed. Hereafter, when the historian of the growth of education in America describes the hard struggle which was needed to establish true scientific medical education, it is to Harvard that he will award the praise of having been the first to step into the arena.

Almost at the same time, the authorities of the University of Pennsylvania took into earnest consideration the plan of medical teaching that had long been pursued here, with the determination

to make such changes in it as might seem required. It will readily be believed that the subject received the full, calm study which it demanded; and that no single step was resolved upon that it was not confidently believed would be heartily endorsed by the graduates of the school and by the entire community. But when all the facts which I have endeavored to lay before you came to be known, and when it appeared that the one and only way in which a medical school can now meet its obligations to its students, to the public, and to science, is by elevating its standard of education, no hesitation was felt in deciding that, as soon as the necessary preliminaries were arranged, this great step should be taken. Assurances were received from generous friends of the institution that rendered it certain that the intended changes could be successfully maintained, even if a temporary decrease in the size of the classes should occur. Every detail of the new plan was carefully considered, and when the whole was fully matured, it was announced to the world in May, 1877, that the system of medical education, which had been conducted here for more than a century, had been replaced by a higher and better system, one more in accordance with the condition of medical science and the wants of the community.

Those of you who are familiar with the features of the present University curriculum will not need to be reminded that, with one exception, it embodies all of those changes which our study of the defects of the American system of medical education has shown to be required. The one omitted is the examination preparatory to matriculation, a feature to which great importance is properly attached. It was not thought feasible to insist upon this immediately; but all are agreed that it must be instituted as soon as possible. For those of you to whom the details of the plan are not yet familiar, I may be pardoned for briefly alluding to some of its excellences as compared with the system pursued at other schools.

The first great advantage is, that each and every student is required to attend three years of college instruction. I believe it is universally admitted that it is simply ridiculous to expect any student to acquire a satisfactory knowledge of medicine in less than that time. Now it is perfectly true, that in other schools, there is nothing to prevent a student from attending lectures for three or four years, but as the system is arranged so as to allow students to graduate after only two years' study, it is impossible for those who choose to study longer to occupy the extra time to the best advantage. They can spread out over three years the instruction which the vast majority take in two years, but they cannot supply the numerous deficiencies it presents. In the largest cities it may be possible to do so in part by paying liberal extra fees to teachers who give private instruction in various branches; but even then they receive only the teaching of comparatively young and inexperienced men and not of their own professors. In the case of most medical schools, moreover, no such additional instruction can be secured even by paying extra fees for it. In the University curriculum, on the other hand, advantage has been taken of the extra year to grade the entire course of teaching, so

that the student passes by a natural gradation from the elementary branches to those which are more complex and practical. The absurdity which we have fully exposed no longer exists, by which students of every grade are placed together to hear the self-same instruction repeated year after year. Instead of this, in the University course, while a sufficient amount of repetition of the most difficult subjects is secured, each class of students pursues by itself those studies which are suited to its stage of advancement. The number of hours devoted each day to didactic lectures is therefore less than at other schools, and the hours thus set free are utilized, during the first two years, for thorough instruction in laboratory work and in practical anatomy; and, during the last year, for careful instruction in clinical medicine and surgery, and in some important special branches. Partial examinations at the end of each year will enable the successful student to get rid of certain branches, and thus, as he advances, to bring to bear all his acquirements and ability with greater concentration upon the important practical studies.

A few words more are needed to describe fully how thorough is the plan proposed for laboratory and clinical work. It would, indeed, have been impossible to undertake such a plan were it not for the completion of this magnificent medical hall, which presents unequalled facilities for practical work in the laboratory and the dissecting-room, and for the two great hospitals which stand in the immediate vicinity and afford unlimited material for clinical illustration. We have profited to the utmost by these advantages in the arrangement of the new plan. In the first place, the student will during the first year have no less than fifteen hours in each week set apart for dissections—anatomical material will be furnished free to him—and thus a more thorough knowledge of practical anatomy will be secured than is elsewhere provided for. In the hurry and cramming which goes on during a two years' course, less and less place has of late been found for dissecting. Yet all must know that a close practical familiarity with anatomy is the only true basis, not merely of surgery, but of physiology and of medicine. Again, I need not remind you of how great importance must be to every physician a knowledge of the microscope, of practical pharmacy, of practical chemistry, and especially of medical chemistry. These are subjects which cannot be taught by lectures alone, for the student must be taken directly into the laboratory and there trained personally in the manipulations and the use of tests and reagents. In most other schools such advantages are never furnished without extra cost; while in this University the classes of the first and second year will be divided into sections of convenient size, and each student will receive personally from his professor practical instruction in the laboratory on all of these subjects.

But it is in the arrangement of the third year that the great superiority of the University course is most clearly shown. I have already dwelt upon the entire absence from the usual system of medical education of any real personal teaching in the practical branches. Every one admits that this is the greatest defect of the system, since it compels the vast majority of graduates to enter on the practice of their profession without the slightest practical train-

ing. In consequence, special care has been taken to provide for this need in the fullest possible manner in the new University plan. The third year class will be divided into sections of suitable size, each of which will receive daily instruction in connection with the hospital wards or the dispensary department in practical medicine, surgery, and gynaecology, in auscultation and percussion, and electro-therapeutics. In addition, similar practical instruction will be given in such important specialties as ophthalmoscopy, diseases of the ear and of the skin. The teaching in all of these branches will be directly conducted by the professors of the respective chairs, but the study of the last-named specialties will not be obligatory upon the student. Thus, every student of the University of Pennsylvania will hereafter enjoy the advantages of a course of practical instruction more thorough and complete than is attainable elsewhere on this continent.

Moreover, while such generous provisions have been made for the regular winter terms, equal care has been taken to make the preliminary course in September, and especially the spring course, more full and valuable than in any other school. Every inducement is offered to students to take advantage of these supplementary courses which, although not at all obligatory, will be found highly profitable. Every facility is also provided for those who may desire after graduation to pursue the more advanced study of certain special branches.

Such are the advantages now offered by the University course; but it is not to be supposed that they have been secured without much self-sacrifice and exertion on the part of the Faculty. In order to carry this plan into effect many of them have voluntarily assumed a twofold or even threefold increase of their labors. In order to free your diplomas from the taint of having been conferred through partiality or self-interest, their direct pecuniary relations with the students have been transferred to the Board of Trustees, and the members of the Faculty now receive fixed salaries.

I have now spoken of the advantages of the new plan, and a few words will suffice to consider the greater taxes which it imposes on the student. As the specific object of the change has been to secure a higher grade of education, I need not say that hard work, faithful application, and good attainments will be required. But besides these the fees are increased, being \$100 more than at most schools, and it will be necessary for every student to bear the expenses of residence in the city during three terms. It is evident, therefore, that from this time forward, those medical students who wish to secure a diploma at the lowest price, in the shortest time, and, I need not add, of the least value, will find no place in the class of the University. But, on the other hand, all those students who are willing to give three years to the study of their profession, and are anxious to obtain a thorough education, will find that the course of this University presents the greatest advantages for the least cost. I have pointed out that at the ordinary medical schools, the student must pay an extra fee for every course of real practical instruction he obtains, and if it were possible for him to secure such extended and thorough practical teaching as is included in the University

plan, it would cost not only \$100, as is here charged, but at least \$250.

This, then, is not a course only for the sons of rich men or for students favored with more than ordinary means; but while it does provide the best education that can be purchased by money, it provides it at so low a cost as to be within the reach of all. Not only so, but, by the liberality of the Board of Trustees, the recommendation of the Medical Faculty has been approved, which provides a certain number of free scholarships open by competitive examination to all deserving applicants. It is the expectation that, as the endowment of the medical department increases, the number of these free scholarships will be correspondingly increased, so that the advantages of the University course shall be accessible even to the poorest, if only possessed of merit and ambition.

I trust I have made it clear that not only the highest motives, but also the claims of self-interest, urge all students to pursue such a course of instruction in medicine as is now established at this University. The effect cannot be supposed to consist only in the better preparation for practice which they will receive. It must be remembered that the full discussion of this question has occupied the press, both general and medical, from one end of the country to the other. Public attention and interest are keenly alive to the importance of the subject, and the course of the medical schools is closely watched. When, then, the oldest and most distinguished of these schools takes so important a step as that which the University of Pennsylvania has just taken, you may be assured that, all over the country, the success of the movement and the careers of those who graduate under the new plan will be watched with unusual interest. We claim, without fear of contradiction, that the course of study you must pursue here will fit you better for the practice of your profession than the course pursued at most other schools. We claim that you, as graduates of the University of Pennsylvania, will be entitled to a higher degree of public confidence than can be accorded to the graduates of those schools whose diplomas cannot be regarded, to an equal extent, as guarantees of thorough practical education in medicine. It is our intention that these facts shall be known to every inhabitant of this country; and in order that the graduates of this University shall profit by that exceptional consideration to which they will be justly entitled, it is essential that they shall proclaim the honor they enjoy by affixing to the title of M.D. the words *University of Pennsylvania*. The effect of this will be inevitable. It will be known to all that the system of education here pursued makes our diploma a guarantee of thorough fitness for the practice of medicine; the public will more rapidly bestow their confidence upon those who possess it, and a more rapid and certain success will follow. Now that Harvard College, Chicago Medical College, the University of Michigan, the University of Syracuse, and the University of Pennsylvania, have successfully adopted the higher system of medical education, it will be impossible for other schools to avoid one of two necessary results. Those among them which are firmly established, well equipped, and situated in favorable localities, must speedily follow the example that has been

set. They cannot afford to incur the invidious comparisons that will constantly be made between their position and that of the more progressive schools. On the other hand, such schools as are ill-equipped and ill-fitted in every way to sustain a high grade of education, must either suspend operations, or must consent to turn out graduates of a lower grade, and who will soon be recognized as such by the public. Many of these graduates will doubtless attend a third year at a reformed medical school, for the benefit of the organized practical teaching there attainable, and for the sake of a degree conferring real distinction upon its recipient.

I speak confidently of the results of the new plan adopted by the University, but it is not without substantial reasons. Although announced but a few months since, the most unqualified endorsements have been bestowed upon it from all quarters, both at home and abroad. The great army of our Alumni who are scattered over the habitable globe, everywhere cherishing a true and loyal love of Alma Mater, and everywhere aiding to elevate her fame by their devotion to humanity and by their able discharge of all the duties of most varied and responsible positions; these have signified in no uncertain way their warm approbation of this great advance on the part of the University. It may be confidently assumed that the entire medical profession will unite in supporting the schools which have ventured to make the long-needed reforms in medical education. None know so well as they the defects of the prevailing system; none know so well as they the disadvantages under which the medical profession labors at the present time; none know, therefore, so well as they that the best way to insure the success of their sons or of their students who are to follow in their own footsteps, is to provide them with a sound, true, and practical training for their professional work.

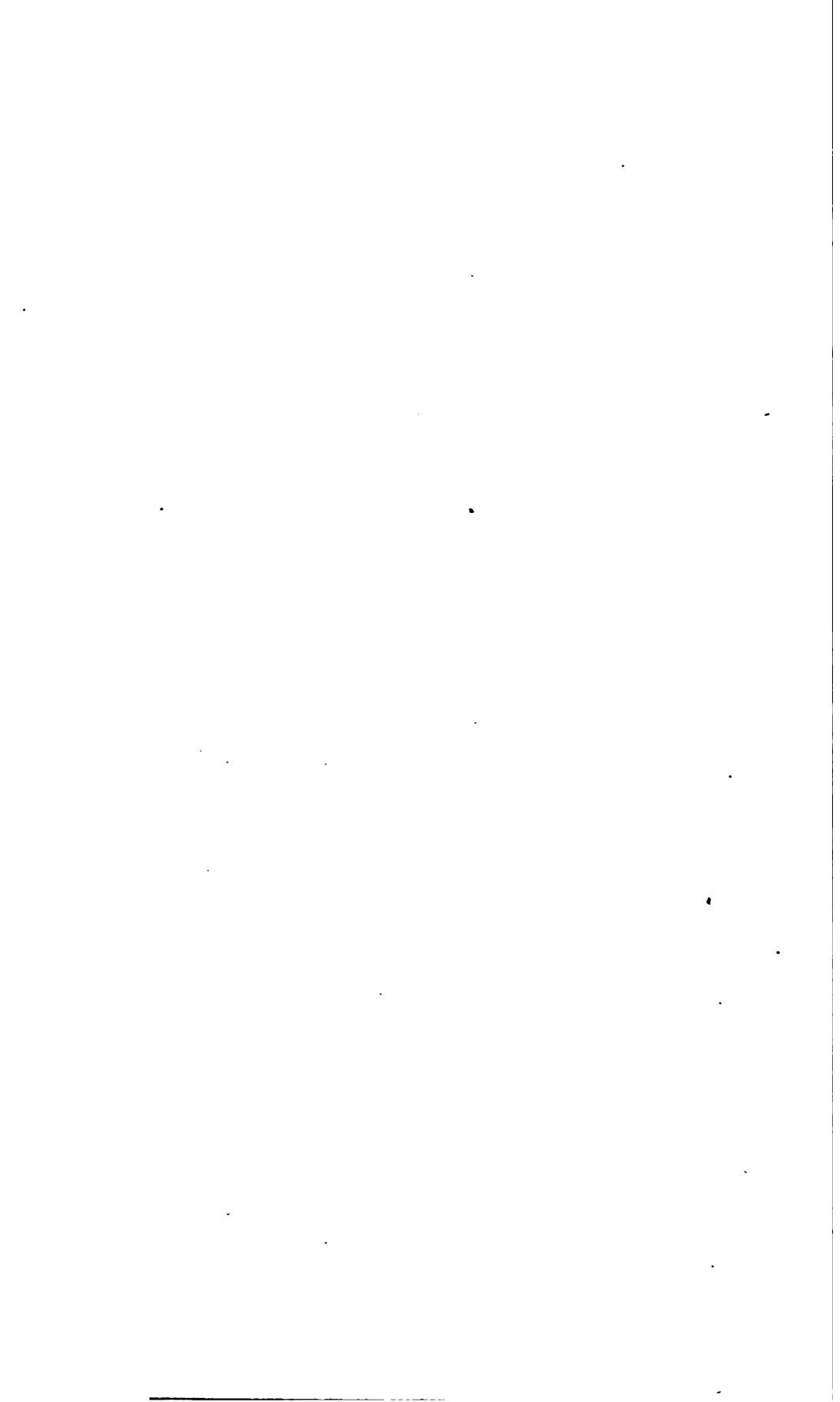
It is true that, on the announcement of the important changes in the system of education in this school, grave doubts were expressed by many of its warmest friends lest such serious falling off in the classes might result as to render it impossible to maintain permanently the advanced position assumed. I have, however, already informed you that, through the almost spontaneous liberality of a number of citizens, a guarantee fund was secured of sufficient size to make it certain that the new course should be sustained, even though a reduction in the size of the classes, greater than was anticipated by any one, should occur. It was only after this essential safeguard was provided that the Trustees ventured on a step which seemed to many to seriously compromise the future welfare of the school.

But, in addition to this, an event of such noteworthy character as to demand special mention soon occurred to strengthen their position, before the final verdict of success was given by the assemblage of a class, whose large size and representative character express the deliberate approval of our course entertained throughout the land. The event to which I refer is the presentation of the sum of \$50,000 for the endowment of the chair of Surgery in the University of Pennsylvania. This noble gift has been made by Mrs. John Rhea Barton, the widow of one of Philadelphia's most eminent surgeons. He was

the nephew of Dr. Benjamin Smith Barton, who filled with applause various chairs in the Medical Department of the University during a period of twenty-six years, and whose reputation as a botanist and scientist was world-wide. Dr. John Rhea Barton himself graduated at this school, and rapidly rose to a position of eminence in the medical profession, equal to that of his illustrious relative. Connected as he was for many years with the surgical staff of the principal hospital in Philadelphia (Pennsylvania Hospital), and enjoying the highest public esteem and reputation, he had ample opportunities for displaying the rare combination of qualities—accurate observation; ready, sure decision; sound practical judgment; great brilliancy and dexterity in operating; and unrivalled fertility of resources—which justly entitle him to rank as one of the greatest surgeons of America. Few medical men have enjoyed a higher and more widespread reputation than did Dr. Barton during his lifetime, and his valuable additions to the art of surgery have kept his name familiar as a household word. He himself, by his skill and achievements, erected an enduring monument in the annals of surgical science, and in the grateful memories of his fellow-men. Yet it is surely most fitting that there should be established this new monument to his memory; and that henceforward for all time the students of this University should learn to revere the name and to emulate the deeds of the illustrious man in whose honor the Rhea-Barton Chair of Surgery has been established.

It is felt, therefore, that the University of Pennsylvania, confident of lofty success, may look forward to a most brilliant future for her Medical Department. But none the less would we appeal to all, not only to her Alumni, but to all who are interested in the advancement of medical science and in the elevation and true success of the medical profession, to aid us by their active sympathy and co-operation. Still wider would we make our appeal. It is possible that for a few years the size of the classes may not be so great as under a less elevated and exacting system. It is certain that for the full development of the wise and generous measures now initiated by the Trustees of the University of Pennsylvania, large expenditures must of necessity be incurred. We would appeal, then, to all who are interested in the cause of pure education, in the development of truth and knowledge, or in the welfare of the community, to aid this venerable institution in the great work in which she is engaged, not only with their sympathy, but with generous contributions to her endowment funds.

Never before was it so proud a distinction to be connected with this great school as student, as teacher, or as patron; because never before was she so truly great as now, when springing forward in the vigor and enthusiasm of renewed youth, she plants far in advance the sacred standard committed to her trust, and summons around her all true, brave spirits who, to win the crown, fear not to endure the burden and the toil.



APPENDIX.

TABLE I. (A. and B.)

The following table shows the date of organization of the 106 medical schools of various kinds, and also their distribution throughout the various States:—

A.

		Regular.	Homeopathic.	DATE OF ORGANIZATION.				
				Eclectic.	Pharma- ceutical.	Dental.		
1	1765	1						
1	1782	1						
1	1797	1						
1	1807	2						
4	1809	1						
	1813	1						
	1819	1						
	1820	1						
6	1821				1			
	1824	1						
	1825	2						
	1826	1						
3	1829				1			
	1833	2						
	1834	1						
	1837	2						
	1839	1		1				
	1840	1				1		
	1841	1			1			
10	1842	1						
	1843	1		1				
	1844	1						
	1845					1		
	1846	2						
	1847	1						
	1848	1	1					
	1849	1	1					
10	1850	2						
	1851	1						
	1852	2						
	1853	1						
	1855	1						
	1856							
	1857							
	1858	1	1	1				
	1859	1	1		1			
8	1860	2	1					
	1861	1						
	1863		1					
	1864	3			1			
	1865			1				
	1866				1	2		
	1867	1			1	3		
	1868	3			1			
	1869	3						
	1870	2			1			
21	1871	1			1			
	1872	3	1		3	1		
	1873	3	1			1		
	1874	3						
	1875		3					
	1876	1						
	Unk'n	1			1			
65		65	11	4	14	12		106

R. H. E. P. D.
101 years : 44 : 6 : 4 : 6 : 6 = 66

R. H. E. P. D.
10 years : 21 : 5 : 0 : 8 : 6 = 40

Calculated from data given in Reports of Commissioner of Education for 1875 and 1876.

B.

STATE.	Regular Schools.	Homeœopathic.	Eclectic.	Dental.	Pharmaceutical.
Alabama	2	...	...	...	...
California	2	...	...	...	1
Connecticut	1	...	...	...	...
Georgia	3	...	1	...	...
Illinois	3	1	1	...	1
Indiana	3	...	...	...	...
Iowa	2	...	...	...	1
Kentucky	5	...	...	...	1
Louisiana	2	...	...	1	...
Maine	1	...	...	...	...
Maryland	3	...	...	2	1
Massachusetts	1	1	...	2	1
Michigan	2	1	...	1	1
Missouri	4	3	...	1	1
New Hampshire	1	...	...	...	...
New York	9	2	1	1	1
Ohio	7	2	1	1	2
Oregon	1	...	...	...	...
Pennsylvania	3	1	...	2	1
South Carolina	2	...	...	...	...
Tennessee	1	...	...	...	1
Texas	1	...	...	1	...
Vermont	1	...	...	...	...
Virginia	2	...	...	...	...
District of Columbia	3	...	...	...	1
	65	11	4	12	14
Total, 106					

TABLES II. AND V. CONSOLIDATED.

	Population.	Number of physicians.	Proportion of physicians to population.	Annual number of medical graduates.	Number of medical schools.	Proportion of schools to population.
United States	44,874,814	62,383	1 to 600	3000	94	1 to 477,392
Astro-Hungarian Empire	35,904,435	14,361	1 to 2500	500 to 600	6	1 to 6,000,000
Belgium	5,336,634	2,048	1 to 2609	71	4	1 to 1,334,159
Brazil	11,780,000	1,200(?)	1 to 10,000(?)	.....	2	1 to 5,890,000
Canada	3,575,577	2,998	1 to 1193	220	8	1 to 426,947
Chili	2,200,000	240	1 to 9167	25 to 30	1	1 to 2,200,000
Cuba	1,000,000	500	1 to 2000	15 to 20	1	1 to 1,000,000
France	36,100,000	19,902 ¹	1 to 1814	750	6 ²	1 to 6,000,000
German Empire	41,060,695	13,686	1 to 3000	500 to 600	23	1 to 1,785,248
Great Britain	32,412,010	19,385	1 to 1672	1743	19	1 to 1,705,895
Italy	28,526,000	8,000	1 to 3500	300	22	1 to 1,296,636
Norway	1,820,000	525	1 to 3480	25 to 30	1	1 to 1,820,000
Sweden	4,560,000	600	1 to 7500	17	3	1 to 1,500,000
Venezuela	1,800,000	200	1 to 9000	10	2	1 to 900,000
Victoria (Australia)	731,528	434	1 to 1686	6	1	1 to 731,528

¹ Of these, 14,718 are physicians, and 5,184 are only health officers. There are only six academies which give the diploma of doctor of medicine; but there are also sixteen preparatory schools where the diploma of health officer is given. As, however, fully three-fourths of all practitioners of medicine take the diploma of M.D., it is impossible to include the preparatory schools in calculating the ratio of medical schools to the number of populations.

TABLE III.

STATE OR TERRITORY.	Population as given in Census of 1870.	Estimated population in 1877, calculated at rate of 25 per cent. increase in ten years.	Regular Medical Schools, Homeopathic and Eclectic Schools, and Colleges of Pharmacy.	Proportion of schools of medicine and pharmacy to present population.	Number of practitioners of medicine according to Census Report of 1870.	Proportion of practitioners of Medicine to population as given in Census of 1870.
Alabama . . .	996,992	1,163,158	2	1 : 581,579	1,418	1 : 703
Arkansas . . .	484,471	565,216	...	...	1,026	1 : 481.8
California . . .	560,247	653,623	3	1 : 217,874	1,257	1 : 445.7
Colorado . . .	39,864	46,508	...	...	70	1 : 569.5
Columbia, Dist. of	131,700	153,650	4	1 : 38,412	326	1 : 404
Connecticut . . .	537,454	627,030	1	1 : 627,030	680	1 : 790.3
Delaware . . .	125,015	145,851	...	...	170	1 : 735
Florida . . .	187,748	219,040	...	...	248	1 : 757
Georgia . . .	1,184,109	1,381,461	4	1 : 345,385	1,537	1 : 770
Illinois . . .	2,539,891	2,963,206	6	1 : 493,868	4,862	1 : 523
Indiana . . .	1,680,637	1,960,774	3	1 : 626,796	3,613	1 : 465
Iowa . . .	1,194,020	1,393,024	3	1 : 464,341	1,865	1 : 639
Kansas . . .	364,399	425,133	...	...	906	1 : 402
Kentucky . . .	1,321,011	1,541,180	6	1 : 256,863	2,414	1 : 547
Louisiana . . .	726,915	848,068	2	1 : 424,034	939	1 : 774
Maine . . .	626,915	731,401	1	1 : 731,401	818	1 : 766
Maryland . . .	780,894	911,043	4	1 : 227,761	1,257	1 : 621
Massachusetts . .	1,457,351	1,700,248	3	1 : 566,748	2,047	1 : 711
Michigan . . .	1,184,059	1,381,403	4	1 : 345,351	2,034	1 : 582
Minnesota . . .	439,706	512,991	...	...	402	1 : 1093
Mississippi . . .	827,922	965,909	...	...	1,511	1 : 547
Missouri . . .	1,721,295	2,008,178	8	1 : 251,023	3,560	1 : 483
Nebraska . . .	122,093	143,492	...	...	247	1 : 498
Nevada . . .	42,491	49,573	...	...	110	1 : 386
New Hampshire .	318,300	371,350	1	1 : 371,350	565	1 : 563
New Jersey . . .	906,096	1,057,112	...	...	1,208	1 : 750
New York . . .	4,382,759	5,113,219	13	1 : 398,324	6,810	1 : 642
North Carolina .	1,071,361	1,239,923	...	...	1,143	1 : 937
Ohio . . .	2,665,260	3,109,470	12	1 : 259,123	4,638	1 : 574
Oregon . . .	90,923	106,077	1	1 : 106,077	206	1 : 441
Pennsylvania . .	3,521,951	4,108,943	5	1 : 821,789	4,843	1 : 727
Rhode Island . .	217,358	253,579	...	...	260	1 : 836
South Carolina .	705,606	823,207	2	1 : 411,604	789	1 : 894
Tennessee . . .	1,258,520	1,468,274	2	1 : 734,137	2,220	1 : 566
Texas . . .	818,579	955,009	1	1 : 955,009	1,906	1 : 429
Vermont . . .	330,551	385,643	1	1 : 385,643	569	1 : 580
Virginia . . .	1,225,163	1,429,357	2	1 : 714,679	2,126	1 : 576
West Virginia .	442,014	515,683	...	...	612	1 : 723
Wisconsin . . .	1,054,670	1,230,450	...	...	915	1 : 1043
<i>Territories—</i>						
Arizona . . .	9,658	11,268	...	...	22	1 : 439
Dakota . . .	14,181	16,545	...	...	20	1 : 709
Idaho . . .	14,999	17,499	...	...	33	1 : 454
Montana . . .	20,595	24,028	...	...	42	1 : 490
New Mexico . .	91,874	107,187	...	...	27	1 : 3402
Utah . . .	86,786	101,251	...	...	46	1 : 1886
Washington . .	28,955	27,948	...	...	43	1 : 557
Wyoming . . .	9,118	10,638	...	...	24	1 : 380
	38,558,371	44,874,814	94	1 : 477,392	62,883	1 : 618

TABLE IV.

In arranging the following countries, of whose systems of medical education a sketch is given, the effort has been made to group them according to certain general resemblances in their systems. Thus, the German Empire, the Austro-Hungarian Empire, and Russia, naturally follow each other. Again, Sweden, Norway, and Denmark form another group. France occupies a position peculiar to herself. Holland and Belgium are closely similar to each other. England, Scotland, and Ireland are included under Great Britain, which, with Canada and Australia, form another natural group, although with certain points of marked dissimilarity. Italy, and the Portuguese and Spanish speaking countries, form the final group, all the members of which possess a system of medical education essentially identical.

There are a few expressions that will frequently occur, particularly in regard to continental countries, to which a special meaning is attached. Among these may be mentioned, as requiring definition, "Certificate of gymnasium," which evidences upon its holder's part a thorough knowledge of Greek, Latin, at least one modern language besides his own, logic, the physical sciences, and mathematics.

The "Certificate of Grammar" is an expression peculiar to the French system, and will be found defined under that head.

The "Año de ampliación" is the term applied in Spain, Brazil, and other Spanish or Portuguese-speaking countries, to the first year of professional study, in which botany, zoölogy, physiological chemistry, and the rudiments of geology and mineralogy constitute the curriculum.

German Empire: population, 41,060,695.—There are twenty-three Universities which confer the Doctorate. The staff of each school is made up of ordinary and extraordinary professors and of lecturers. The former only are concerned in the administration of the colleges, which are supported by the government, although they possess an almost absolute autonomy.

To matriculate, the applicant must either present a "certificate of a gymnasium" or pass a preliminary examination upon Latin, Greek, German, history, mathematics, and the elements of natural science.

The course extends over four years, $9\frac{1}{2}$ months in each year, and is as follows:—

	Number of hours weekly.
Chemistry	6 for 1 year.
Physics	4 " "
Zoology and comparative anatomy	3 " "
Botany	3 " "
Mineralogy and geology	2 " "
Anatomy, histology, and preparation of specimens	10 " "
Physiology, with work in laboratory	8 " "
General pathology, pathological anatomy, with practical work	6 " "
Pharmacology, toxicology, prescription writing	2 " " or 4 for $\frac{1}{2}$ year.
Special pathology, medical clinics, course on physical diagnosis	10 for 2 years.
General and special surgery, clinics, bandaging, operating	10 for 1 year or 5 for 2 yrs.
Obstetrics and gynaecology, clinics	3 " "
Eye and ear clinics. Use of ophthalmoscope. Operations	4 " "
Forensic medicine	2 " " or 4 for $\frac{1}{2}$ year.

Examinations are held at the end of the second year (Tentamen physicum) upon anatomy, physiology, chemistry, physics, botany, zoology, and mineralogy, and, at the end of the fourth year, upon the remaining subjects of the course. This latter examination precedes more or less closely (according to the proficiency of the candidate) the final examination, which is conducted by the faculty, each professor examining the candidate in his own department. After passing the examination and presenting a printed thesis, he receives the degree of Doctor of Medicine.

The right to practise, however, can only be obtained by passing the State examination, which is conducted by a board composed of the professors of the different colleges, appointed annually by the ministry. This examination is divided into five sections, and includes, besides a theoretical examination, the preparation and demonstration of specimens of the osseous, vascular, and nervous systems; the demonstration of an autopsy and a practical examination in medicine, surgery, obstetrics and gynaecology, physiology and microscopy. It is not necessary that the applicant for the license should be a doctor of medicine. In fact the doctorate has no special privileges attached to it other than that it admits the possessor to examinations for official positions. As showing the severity with which the State examinations are conducted, it may be stated that in 1875-6 out of 378 applicants for the license, only 292 passed.

The professors receive fixed salaries, varying from \$800 to \$2400 annually, and increased every ten years by the addition of from \$100 to \$250: they also have the privilege of augmenting their income by giving private courses. The students' fees for the entire course vary in different schools from \$180 to \$360.

Austro-Hungarian Empire: population 35,904,435.—There are 6 medical schools: at the Universities of Vienna, Prague, Innsbruck, Pesth, Clausenburg, and Gratz. They are all supported by the government, and are modelled upon the same plan. To matriculate, the applicant must present a certificate from a gymnasium. The course of study extends over a period of at least 5 years, of about 9 months in each year. The studies are arranged as follows:—

1st and 2d years.	3d, 4th, and 5th years.
Anatomy,	Pathology,
Physiology,	Pathological anatomy,
Chemistry,	Histology,
Physics,	Pharmacology,
Botany,	Post-mortem examinations,
Zoology,	Physical diagnosis,
Mineralogy,	Obstetrics,
Histology,	Practice of medicine,
Practical laboratory work in,	Surgery,
Dissection.	Gynaecology,
	Medical jurisprudence,
	Toxicology,
	Ophthalmology,
	Clinics and practical work in the wards of a hospital and in a dispensary.

Examinations are held at the end of the 2d year upon the various subjects of the first 2 years; and at the end of the 5th year upon the subjects of the preceding 3 years. Two or three months after the latter examination, the candidate must pass a third and final one, which secures the diploma of Doctor of Medicine with the right to practise.

The professors have no pecuniary interest in the size of their classes. They have a fixed salary varying from \$1100 to \$2000, with an addition of from \$100 to \$250 every 10 years, and have the privilege of giving private courses, by means of which their income may be increased to about \$3500. The fees for the entire course amount to about \$250.

Russia: population 85,685,945.—There are 8 medical schools in Russia, viz.: the Universities of Dorpat, Helsingfors, Moscow, Warsaw, Kieff, Charkow, Kazan, and the Medico-chirurgical Academy of St. Petersburgh.

To matriculate, the applicant must have a certificate from a gymnasium. The course of medical study extends over 5 years, with examinations at the end of each year. The arrangement of the course of study is similar to that in Germany. Upon passing the final examination upon all the subjects of the entire course, the candidate receives the right to practise, with the title of "Physician." To obtain the degree of Doctor of Medicine, he must have the above title, and undergo a written examination and also present a thesis. There was formerly a third degree, viz., Doctor of Medicine and Surgery, obtained after an examination in surgery, but this is fast becoming obsolete. The professors receive a salary of \$2400. The students pay for their tuition about \$40 yearly, excepting at the Academy of St. Petersburgh, where the lectures are free.

Sweden: population 4,500,000.—There are 2 Universities (Lund and Upsala) and 1 academy (Stockholm), all of which confer the license to practise.

To matriculate, the applicant must have a certificate from a gymnasium. Three years after matriculating the student is required to pass the medico-philosophical examination, which includes physics, chemistry, mathematics, botany, zoology, and comparative anatomy; 3 years later, he must pass the examination for the academic degree of candidate in medicine, which includes anatomy, physiology, physiological chemistry, general pathology, pathological anatomy, and pharmacology; 4 years later, he must pass a final examination upon practical medicine and surgery, obstetrics, ophthalmology, and medical jurisprudence. Upon passing the above examination, the candidate receives the right to practise. Attendance upon the lectures is not obligatory, but the student is obliged to attend clinics for at least 1½ years. The course of medical studies is thus not less than 10 years.

The degree of doctor of medicine is only granted by the Universities of Lund and Upsala. The requirements are that the candidate must be a licentiate, and must present a thesis, subject to debate. The professors receive a fixed salary of from \$1120 to \$1400. As the students pay no fees whatever, the professors have no pecuniary interest in the size of the classes.

Norway: population, 1,820,000.—The only medical school is connected with the University of Christiania. To matriculate as a student of medicine, the applicant must pass two preliminary examinations, one in arts, including Norwegian, Latin, Greek, French, German, English; mathematics, geography, and history; and one in philosophy, including geometry, zoology, botany, astronomy, and the elements of chemistry and physics. He then enters on the study of medicine proper, which on an average occupies 6½ years.

There are 3 examinations, arranged as follows:—

1st examination, held 2½ years after matriculation, upon anatomy, dissection, use of the microscope, histology, chemistry (organic and inorganic), zoology, and botany.

2d examination, held 3½ years after the 1st, upon physics, pharmacology, toxicology, medicine, therapeutics, general pathology and pathological anatomy, surgery, ophthalmology, skin diseases, and syphilis.

3d examination, held about a year after the 2d, upon surgery and bandaging, topographical anatomy, obstetrics and gynaecology, diseases of children, forensic medicine, hygiene, and a practical examination in medicine and surgery. Thorough practical work in connection with the various hospital wards is also obligatory. Upon passing the above examinations, which are conducted by the faculty, the candidate receives the right to practise. The doctorate is a scientific degree, giving the right to lecture at the University; and can be obtained only by passing a very severe examination. As the fees connected with this special examination are also high, but few Norwegian physicians undergo it.

The professors receive a salary, beginning with \$1000 and gradually increasing to \$1900, the remuneration of each professor depending upon the length of time he has occupied the chair. As the graduates pay no fees, the faculty has no pecuniary interest in the number of students.

Denmark: population, 1,784,741.—The only medical school is connected with the University of Copenhagen. To matriculate, the applicant is required to present a certificate from a recognized literary institute, and must then attend a course of 2 years upon zoology, botany, physics, and chemistry, including analysis. After passing the examination upon these subjects, he is admitted to the course on medicine, which extends over 5 years. The candidate is obliged to pass a written examination upon medicine, surgery, and legal medicine; a practical examination upon surgery, medicine, operations, and dissections; and an oral examination, before the faculty and 2 censors appointed by the minister, upon anatomy, physiology, pharmacology, pathological anatomy and general pathology, medicine, surgery, and obstetrics. These examinations are divided into two portions, with an interval between them of, at the most, one year. The degree of doctor of medicine, with the right to practise, is conferred after the above examinations. Attendance upon the lectures is not obligatory, the student being merely required to present a certificate of attendance upon the clinics before the final examination. The faculty consists of professors and teachers; the former receive a salary of from \$900 to \$1650—the latter of from \$650 to \$1450. These salaries are paid by the State, so that the faculty has no pecuniary interest in the size of the classes.

France: population, 36,100,000.—There are six Academies which confer the degree of doctor of medicine or of surgery (Paris, Montpellier, Nancy, Lisle, Lyons, Bordeaux). There are also 16 preparatory medical schools, where the diploma of health officer (officier de santé) only is given. The latter diploma enables the possessor to practise only in the department of France, where it has been received. He is also forbidden to perform major surgical operations without the presence of a doctor. Accordingly the great majority of medical students take the degree of doctor of medicine. Thus there are in France 14,718 doctors, and only 5184 health officers.

To matriculate at a preparatory medical school, the applicant must present a "certificate of grammar," which shows some acquaintance with classical and modern languages, in addition to a thorough knowledge of history, geography, arithmetic, and the elements of geometry. The course extends over 3 years, and consists of lectures upon chemistry, zoology, anatomy, physiology, gynaecology, and the practice of medicine, surgery, and obstetrics. Two years of clinical work in the wards of a hospital are also required. A partial examination is held at the end of the first and second years, and a final one at the end of the third year, on all the subjects of the course. A thesis must also be presented. The candidate then receives the diploma of health officer.

To matriculate at an Academy, the applicant must have the degrees of bachelor of arts and of bachelor of sciences. The course extends over 4 years, of 10 months in each year, and is arranged as follows (Academy of Paris):—

1st yr.	Medical physics. Medical chemistry. Anatomy with dissections. Zoology. Physiology and histology.	3d yr.	Dissections. Surgery and surgical clinics. Practice of medicine and medical clinics. Didactic and practical obstetrics.
2d yr.	Anatomy with dissections. Histology. Pathology. Surgery and surgical clinics. Physiology. Practice of medicine and medical clinics.	4th yr.	Dissections. Practice of medicine. Surgery. Obstetrics. Legal medicine. Pathological anatomy. Materia medica and therapeutics. Hygiene.

In addition, there are required practical laboratory work, and clinical work in connection with the hospitals, for two years. This may be done either the last two years of the course, or the last year and the year following. There is a partial examination at the end of each of the three first years; and, at the close, the final examination for the doctorate consists of 5 parts, including all the subjects of the course, together with the presentation of a thesis. The student's fees for the entire course amount to \$253. The professors receive a salary (equivalent to about \$1600 annually), and have no pecuniary interest whatever in the size of their classes.

Holland: population, 1,313,292.—There are 3 Universities (Leyden, Groningen, and Utrecht) which confer the doctorate, and an Athenæum at Amsterdam which confers no degree. The Universities are supported entirely by the State.

To matriculate at an university, the applicant must present a certificate from a gymnasium, or undergo an equivalent examination. The course extends over 6 years, including practical work in laboratories and in hospital wards. The examinations are held every two years upon the subjects of the preceding two years' lectures. After passing the final examination, and presenting a thesis, which is subject to debate, the candidate receives the degree of Doctor of Medicine. The right to practise is not, however, conveyed with this degree, but can be obtained only by passing an examination before a special board, consisting of 8 professors appointed annually by the government.

The examination for the license to practise may be passed either with or without the degree of M.D. If the applicant has not a certificate of gymnasium, or the diploma of doctor of medicine, he must first pass a literary and philosophic examination. The subsequent examination (which must be passed by all) includes general and special pathology, pharmacology, morbid anatomy, medical jurisprudence, and clinical medicine, surgery, and obstetrics.

The professors receive a salary (equivalent to about \$960), and have no pecuniary interest in the number of students. The fees are quite large.

Belgium: population 5,330,634.—There are 4 Universities (Liege, Ghent, Louvain, and Brussels). The first two are state universities, and are supported by the government. To matriculate, the applicant must be a graduate of a literary college, since, although this is no longer required by law, most of the universities demand it. If he is not a graduate of such an institution, he must pass a thorough preliminary examination. He then attends for two years a scientific course, including psychology, chemistry (organic and inorganic), physics, botany, zoology, and mineralogy, and having passed a satisfactory examination is admitted to the medical department.

The course of medical study extends over 5 years, and is arranged as follows:—

1st and 2d yrs. Descriptive anatomy.	3d and 4th yrs. General pathology.
Histology.	Therapeutics.
Physiology.	Theory and practice of
Pharmacology.	medicine.
Comparative anatomy.	Morbid anatomy.

5th yr. Theory and practice of surgery
and obstetrics.

The course also includes practical laboratory work; operative surgery; and attendance for 3 years upon clinics in medicine, surgery, and obstetrics. Examinations are held at the end of the 2d, 4th, and 5th years upon the subjects of the corresponding sections of the course. The examination for the degree of doctor of medicine, conferring the right to practise, is held a few weeks after the close of the course, and includes the general subjects of the course, together with practical examinations in clinical medicine, surgery

and obstetrics, and in operative surgery. This degree is conferred by the Universities, but the diploma must be legalized by a government commission, whose duty it is to ascertain if all the conditions exacted by law have been complied with.

There is but one class of physicians, but the Universities occasionally give the diploma of "Docteur Spécial" in surgery, obstetrics, ophthalmology, etc., to those who, having passed the ordinary examinations and acquired the degree of M.D., pass a more advanced and thorough examination in any of these specialties: The possessor of such a special diploma has the right, which none others but the members of the Faculty possess, of giving private courses of instruction on that specialty.

The medical faculty is made up of ordinary and extraordinary professors, who, although they rank equally, receive different salaries, the former, with regular salary and perquisites, receive from \$2000 to \$2600, the latter \$1000.

Great Britain: population 32,412,010.—There are 19 medical schools which confer the right to practise; 10, viz., the Universities, confer the doctorate; the remainder bestow the various titles of licentiate, member and fellow. To matriculate, the applicant must either possess a degree in arts of some recognized collegiate institution or must pass a preliminary examination upon the following subjects: English grammar and composition, arithmetic, algebra, geometry, Latin translation and grammar, and upon one of the following optional subjects: Greek, French, German, or elementary mechanics.

The course extends over four years, each year comprising a winter session of six months, and a summer session of about three months, and is as follows:—

Anatomy with dissection	2 winter sessions.
Physics	2 " "
Chemistry	6 months.
Practical chemistry	3 "
Materia medica	3 "
Practical pharmacy	3 "
Botany	3 "
Morbid anatomy, including post-mortem examinations	6 "
Practice of medicine	2 winter sessions
Surgery	2 "
Clinical medicine	2 sum'r and 2 winter sessions.
Clinical surgery	2 "
Midwifery	3 months.
Diseases of women and children	6 "
Forensic medicine	3 "
Hospital clinics	1 winter and 2 sum'r sessions.

During the attendance at an hospital the student must serve as clinical dresser for three months and as clinical clerk for three months.

The examinations are two in number, partly written and partly oral. The first, at the end of the second year, embraces chemistry, chemical physics, anatomy, physiology, materia medica, and pharmacy. The final examination, at the end of the fourth year, includes the remaining subjects of the course. The examinations are quite rigid, and are conducted by a board composed of professors and of others having no connection with the college. Excellence in one or more subjects is not allowed to compensate for failure in others. In 1875, of 2217 applicants for degrees, diplomas, or license, 1743 passed.

Upon passing the above final examination the candidate receives the right to practise with the title (differing in different schools) of licentiate, member, fellow, bachelor of medicine, bachelor of medicine and master of surgery, or doctor of medicine. In Edinburgh the degree of M.D. is only to be obtained after first having taken the degree both of bachelor of medicine and master of surgery, and after having devoted two years to actual practice; no special examination is required, but the candidate must present a thesis. The higher titles such as F.R.C.S. (Fellow of the Royal College of Surgeons), F.R.C.P.

(Fellow of the Royal College of Physicians), and M.D. (Doctor of Medicine), have no privileges attached to them outside of the college granting them, excepting that they are requisite for appointment upon the staff of hospitals of any reputation.

The professors' salaries are derived entirely from the fees of the students, and thus depend directly upon the size of the classes.

Canada: population 2,812,367.—There are 8 medical schools.

To matriculate, the applicant must pass an examination before a board appointed annually, upon English grammar and composition, arithmetic, geometry, Latin, and botany, and also one of the following optional subjects, Greek, French, German, or natural philosophy. In the province of Quebec a knowledge of French is required. Those who have the degree of bachelor of arts are exempted from passing the above examination. The course of medical study extends over 4 years, with one session of 6 months in each year. In the province of Ontario a bachelor of arts is not required to devote more than 3 years to the study of medicine.

The course is as follows:—

Two sessions each of—	One session of—
Descriptive and practical anatomy.	Medical jurisprudence.
Practice of medicine and clinical medicine.	One three months' course on—
Surgery and clinical surgery.	Botany.
Midwifery and gynaecology.	Hygiene.
Chemistry.	A course of microscopic anatomy, of physiology, and of pathology.
Materia medica and therapeutics.	Three sessions attendance upon hospital clinics.
Physiology and pathology.	

The examinations are held at the end of the third and fourth years upon the subjects of the course. Upon passing the final examination, the candidate receives the degree of doctor of medicine, or, as in some of the universities, the degree of bachelor of medicine, to be followed in a year or two by the doctorate. The title of M.D. does not confer the license to practise. This can only be obtained from a board called the Provincial Board, appointed by the College of Physicians and Surgeons of Quebec or of Ontario. In the latter province, the candidate must pass an examination before the board. In the former, the license is granted without examination to a graduate of any British University.

Australia: population 1,565,294.—There are two Universities, one at Melbourne and one at Sydney. Before matriculation, the candidate must pass a rigorous examination in languages, mathematics, etc. The course of medical study extends over five years (9 months a year), and includes thorough practical work in laboratories and in hospital wards. The examinations are held annually upon the various subjects of the lectures; and are both written and oral. The final examination includes all the subjects of the 4th and 5th years, with practical tests in dissection, operative surgery, clinical surgery, and medicine. Candidates are required to pass in all the subjects. The degree of M.B. (Bachelor of Medicine), with license to practise, is then given. To obtain the degree of M.D. (Doctor of Medicine), which is a title merely conferring greater professional prestige, the applicant must have taken the degree of M.B., and subsequently have passed two years in hospital practice, or five years in private practice, including, in either case, attendance for three months on the practice of a hospital for lunatics; and must also pass a special and elaborate examination, both theoretical and practical in character.

The curriculum is arranged as follows:—

1st year.—Natural philosophy, chemistry with laboratory practice.

2d year.—Botany, materia medica and therapeutics, comparative anatomy and zoology, descriptive and surgical anatomy, dissection.

3d year.—General anatomy, physiology, pathology, descriptive and surgical anatomy, surgery, dissection, practical pharmacy, operative surgery, surgical clinics.

4th year.—Theory and practice of medicine, obstetrics and diseases of women and children, general anatomy, physiology, pathology, dissection, clinical medicine and surgery.

5th year.—Theory and practice of medicine, forensic medicine, clinical medicine, and practical obstetrics.

Italy: population, 28,526,000.—There are 17 State Universities, 4 so-called free Universities, and 1 Academy. To matriculate, the applicant must possess a certificate from a lycéum, which is a high grade of literary institute. The course of medical study extends over 6 years, of 9½ months in each year (maximum number of hrs. 36 per week) :—

1st year.—Botany, physics, zoology, human anatomy, microscopy.

2d year.—Chemistry, comparative anatomy, human anatomy, dissections, histology.

3d year.—Human physiology, general pathology, *materia medica* and pharmacology.

4th year.—Topographical anatomy, general medical and surgical pathology and clinics, pathological anatomy.

5th year.—Practice of medicine and surgery, medical and surgical clinics, operative surgery, midwifery, and ophthalmology.

6th year.—Mental diseases, medical jurisprudence, and clinics in medicine, surgery, obstetrics, dermatology, and syphilis.

There are 3 examinations, held at intervals of 2 years, by a commission composed of professors, with one or two associates having no connection whatever with the schools, and nominated by government. Excellence in one or more branches is not allowed to compensate for failure in others. Upon passing the 2d examination at the end of the 4th year, the student receives the title of licentiate, which is merely an academic distinction. The final examination at the end of the 6th year includes not only all the subjects of the entire course of study, but also the diagnosis and treatment of medical, surgical, and obstetric cases. Upon passing this examination, and presenting a thesis, the candidate receives the degree of doctor of medicine and surgery, with the right to practise. The faculty consists of ordinary and extraordinary professors, the only difference between them being one of salary. The former receive according to seniority from \$1000 to \$1200 annually; the latter about \$600. The professors have no pecuniary interest in the size of the classes. The fees for the entire course are \$172.

Portugal: population 4,000,000.—There are three medical schools (Coimbra, Oporto, and Lisbon), all supported by the government. To matriculate, the applicant must pass an examination in Latin, Portuguese, French, English, mathematics, elementary physics, and chemistry, natural history, logic, history, and geography.

The course extends over five years of nine months each, and is as follows:—

1st year.—Chemistry (organic and inorganic), physics, anatomy.

2d year.—Zoology, physiology, anatomy, histology.

3d year.—Botany, pharmacology, general pathology, clinical and operative surgery.

4th year.—Special pathology, surgery, pathological anatomy, medical and surgical clinics.

5th year.—Legal medicine, toxicology, hygiene, obstetrics and gynaecology, medical, surgical, and obstetrical clinics.

The examinations are held at the end of each year; after passing the final examination the candidate receives the degree of Licentiate, with the right to practise.

The doctorate is conferred upon the licentiate upon presentation of a thesis. The professors receive a salary of about \$800 annually, and are independent of the size of their classes.

Brazil: population 11,780,000.—There are two Universities, Rio de Janeiro

and Bahia. To matriculate, the applicant must pass a preliminary examination in Latin, French, English, philosophy, history, geography, and mathematics. The course of medical study extends over a period of six years, arranged as follows:—

1st year.—Physics, chemistry, mineralogy, anatomy.

2d year.—Botany, zoology, organic chemistry, physiology, anatomy.

3d year.—Physiology, pathological anatomy, general pathology.

4th year.—External and internal pathology, obstetrics and diseases of women and children.

5th year.—External and internal pathology, obstetrics, *materia medica*, and therapeutics.

6th year.—Hygiene, history of medicine, medical jurisprudence, pharmacy.

Ample clinical and practical instruction in the hospital and laboratories is also provided for. Examinations are held at the end of each year upon the studies of the preceding year. Upon passing the final examination, which embraces all the subjects of the above course, and upon the presentation of a thesis, the candidate receives the degree of doctor of medicine with the right to practise.

The student's fees are about \$20 per annum. The professors receive a fixed salary from the government, and are independent of the size of their classes. The appropriation for the annual expenses of the two schools in 1873 was \$217,000.

Venezuela: population 1,800,000.—There are two Universities, viz., Caracas and Merida. To matriculate, the applicant must possess the degree of Ph.B. (Bachelor of Philosophy), in order to obtain which he must have spent five years at least in the study of Latin, philosophy, logic, ideology, psychology, ethics, history, mathematics, and the physical sciences. Although the student may have taken this course at any university, the degree of Ph.B. is only to be obtained by passing an examination at one of the official institutions.

The course of medical study extends over six years. Examinations are held at definite intervals during the course upon the previous studies, and the successful students receive the titles successively of bachelor of medicine and licentiate. During some period of these eleven years he must also have studied and passed a creditable examination upon at least one modern language.

The final examination is strict, and is both theoretical and practical in character. It is conducted by a board of physicians called the Medical Faculty. The candidates who have passed this successfully receive the title of "physician" with the right to practise.

The doctorate is merely an honorary title, no examination being required to obtain it, and no privilege whatever being attached to it.

The professors receive a salary of \$50 a month. After having served for from fifteen to twenty years, and having published a work approved by the faculty, they are retired upon full salary, or are retained, if they so desire, at a salary of \$100 monthly.

Chili: population 2,300,000.—There is but one medical school. To matriculate, the applicant must have a diploma of a collegiate institute.

The course extends over six years, and is as follows:—

1st year.—Descriptive anatomy,
Inorganic chemistry,
Botany.

2d year.—Descriptive anatomy,
Physiology,
Organic chemistry.

3d year.—General pathology,
External pathology,
Pharmacy.

4th year.—External pathology,
Internal pathology.

5th year.—Medical and surgical clinics,
Practical classes,
Therapeutics & *materia medica*,
Hygiene.

6th year.—General clinics,
Obstetrics,
Diseases of women and children,
Legal medicine and toxicology,
Mental diseases.

Upon passing an examination in the above subjects, the candidate receives the degree of doctor of medicine with the right to practise.

The professors receive a salary of \$1000 annually. Those who are engaged in hospital duties receive \$1200.

Spain: population 16,885,560.—There are three medical schools. To matriculate, the candidate must have the degree of doctor of philosophy. The course of medical study is four years, the student being required to take in addition the *ano de ampliacion*. The license to practise is given, with the title of Licentiate, to the candidate upon his passing the final examination. The University of Madrid alone confers the doctorate.

The professors receive a fixed salary of \$600 annually, with the exception of at Madrid, where they receive from \$800 to \$1800.

Cuba: population 1,000,000.—There is but one University, viz., Havana. To matriculate as a student of medicine, the applicant must possess a degree in arts from some one of the government colleges.

During the first year (*ano de ampliacion*) the student attends lectures upon botany, zoology, physics, chemistry, and the rudiments of geology and mineralogy. He then enters upon the study of medicine proper, the course extending over six years, with examinations at the end of each year.

The curriculum is as follows:—

1st year.—Descriptive anatomy and dissections.

2d year.—Anatomy, physiology, and histology.

3d year.—Therapeutics, *materia medica*, art of prescribing, pathology, surgical anatomy with operations.

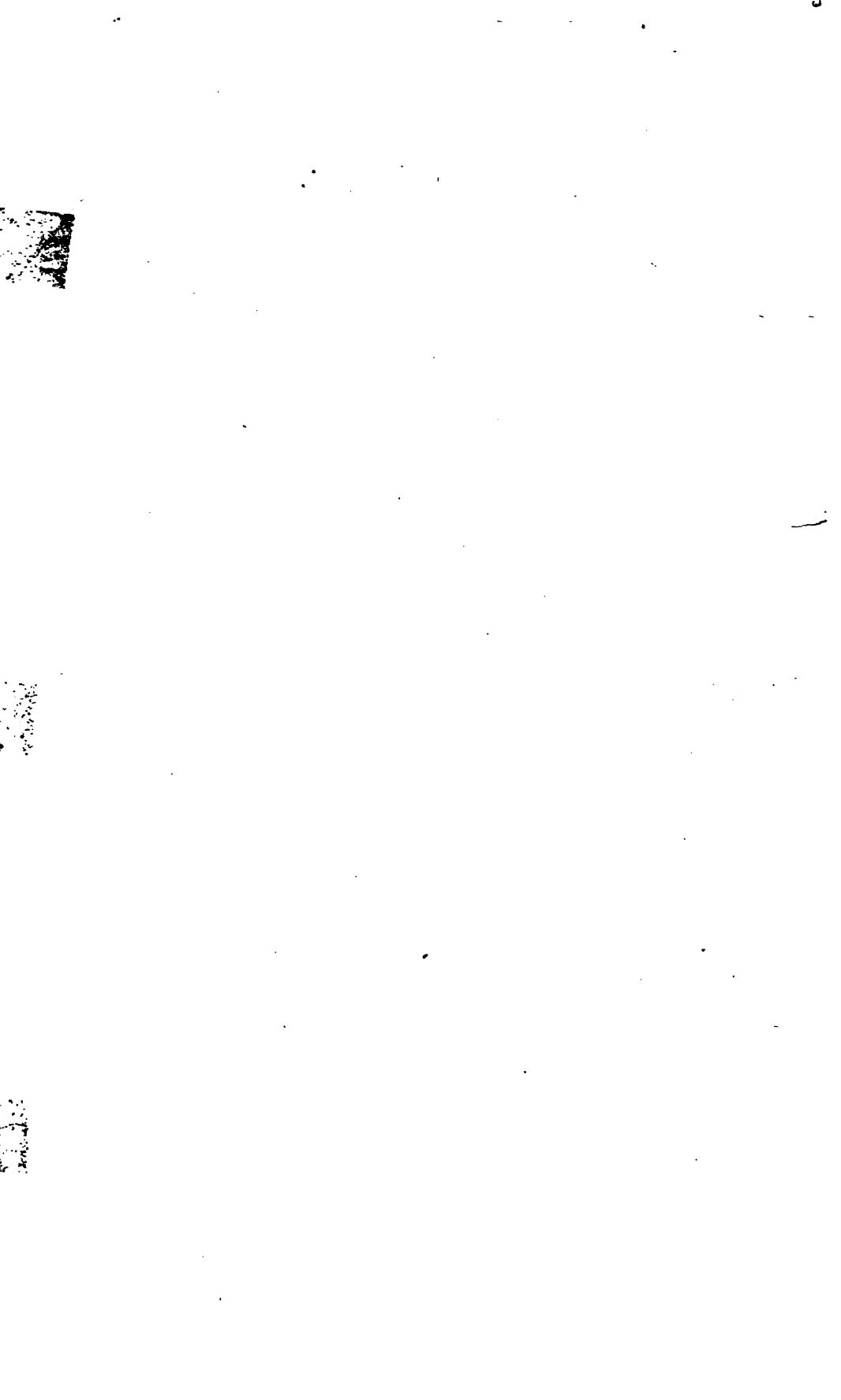
4th year.—External pathology, obstetrics, diseases of women and children, clinical medicine and surgery.

5th year.—Internal pathology, clinical medicine and surgery.

6th year.—Medical jurisprudence, clinical medicine and surgery.

Upon passing a theoretical and practical examination upon all the subjects of the course, the candidate receives the right to practise, with the title of Licentiate. To obtain the Doctorate, the licentiate must spend a year in studying the history of medicine and chemical analysis as applied to medicine, pass an examination upon any subject in medicine, and present and defend a thesis. Only doctors of medicine can aspire to hold a professorship; but other than this there are no privileges attaching to it.*

* We are informed that since the year 1872 the degree has been abandoned.





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